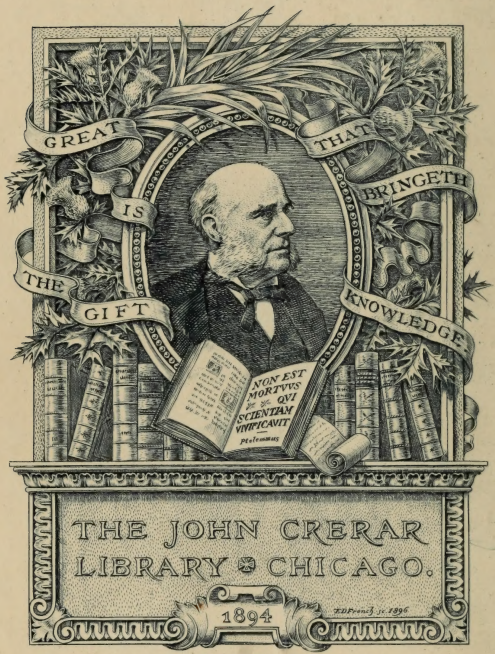


PRESENTED BY

University

Digitized by the Internet Archive
in 2012 with funding from
University of Illinois Urbana-Champaign

http://archive.org/details/registerofficia1013clar

C2H1

Clark University
in the City of Worcester
Massachusetts

Register and Twenty-second Official Announcement

1910

135057

THE
JOHN CRERAR
LIBRARY

CLARK UNIVERSITY

WORCESTER, MASSACHUSETTS

Wilmarth

REGISTER AND TWENTY-SECOND OFFICIAL ANNOUNCEMENT

WORCESTER, MASSACHUSETTS
Published for the University
April, 1910

A.D.W. 10

THE
CORNELL
LIBRARY

BOARD OF TRUSTEES

*Thomas H. Gage	Arthur F. Estabrook
A. George Bullock	Herbert Parker
Orlando W. Norcross	Lucius Tuttle
Francis H. Dewey	Austin S. Garver

OFFICERS

President . . .	A. George Bullock
Vice-President and Treasurer	Francis H. Dewey
Secretary . . .	G. Stanley Hall

COMMITTEES

Finance

*Thomas H. Gage	Francis H. Dewey
A. George Bullock	Arthur F. Estabrook

Buildings

*Thomas H. Gage	Orlando W. Norcross

*Died September 17, 1909.

378.744
C) H1
337980

CALENDAR 1910-1911

1910		
April 4	Monday	Spring Recess
April 9	Saturday	
April 19	Tuesday	Patriots' Day
May 30	Monday	Memorial Day
June 16	Thursday	Twenty-first academic year closes

Summer Vacation of 14 Weeks

Sept. 22	Thursday	Twenty-second academic year begins
Nov. 24	Thursday	Thanksgiving Day
Dec. 26	Monday	Christmas Recess
1911		
Jan. 7	Saturday	
Feb. 1	Wednesday	Founder's Day*
Feb. 22	Wednesday	Washington's Birthday
April 3	Monday	Spring Recess
April 8	Saturday	
April 19	Wednesday	Patriots' Day
May 30	Tuesday	Memorial Day
June 15	Thursday	Twenty-second academic year closes

*Not a holiday.

MEMBERS

STAFF

G. Stanley Hall, Ph.D., LL.D. 94 Woodland St.

President of the University and Professor of Psychology

A.B., Williams College, 1867; A.M., 1870; Ph.D., Harvard University, 1878; Lecturer in Harvard and Williams Colleges, 1880–81; Professor of Psychology, Johns Hopkins University, 1881–88; LL.D., University of Michigan, 1888, Williams College, 1889, and Johns Hopkins University, 1902; Chairman of the Library Committee and Curator of the Art Collection, Clark University. Resident Member of the Massachusetts Historical Society.

William E. Story, Ph.D. 17 Hammond St.

Professor of Mathematics and Secretary of the Faculty

A.B., Harvard University, 1871; Ph.D., Leipzig, 1875; Parker Fellow (Harvard), 1874–75; Tutor of Mathematics, Harvard University, 1875–76; Associate, Assistant Professor, and Associate Professor of Mathematics, Johns Hopkins University, 1876–89; Professor of Mathematics, Clark College, 1902–07. Member of the National Academy of Sciences; Member of the London Mathematical Society; Resident Fellow of the American Academy of Arts and Sciences.

Edmund C. Sanford, Ph.D., Sc.D.

Lecturer on College Administration 96 Woodland St.

A.B., University of California, 1883; Fellow, Johns Hopkins University, 1887; Ph.D., Johns Hopkins University, 1888; Instructor in Psychology, Johns Hopkins University, 1888; Instructor in Psychology, Clark University, 1889-92; Assistant Professor, 1892–1900; Professor of Psychology, Clark College, 1903–07; Professor of Experimental and Comparative Psychology, Clark University, 1900–1909; Sc. D., Hobart College, 1909; President of Clark College, 1909-.

Arthur G. Webster, Ph.D., Sc.D., LL.D.

Professor of Physics 66 West St.

A.B., Harvard University, 1885; Instructor in Mathematics, Harvard University, 1885-86; Parker Fellow, 1886-89; Student, Universities of Berlin, Paris, Stockholm, 1886-90; Ph.D., Berlin, 1890; Docent in Physics, Clark University, 1890–92; Assistant Professor, 1892–1900; Professor of Physics, Clark College, 1902–07; Director of Physical Laboratories; D.Sc., Tufts College, 1905; LL.D., Hobart College, 1908. Member of the National Academy of Sciences; Resident Fellow of the American Academy of Arts and Sciences; Member of the American Philosophical Society.

HENRY TABER, PH.D.

Professor of Mathematics — 65 West St.

Ph.B., Yale University, 1882; Ph.D., Johns Hopkins University, 1888; Assistant in Mathematics, Johns Hopkins University, 1888–89; Docent in Mathematics, Clark University, 1889-92; Assistant Professor, 1892–1903. Member of the London Mathematical Society; Resident Fellow of the American Academy of Arts and Sciences.

CLIFTON F. HODGE, PH.D.

Professor of Biology — 103 May St.

A.B., Ripon College, 1882; Fellow in Biology, Johns Hopkins University, 1888–89; Ph.D., Johns Hopkins University, 1889; Fellow in Psychology and Assistant in Neurology, Clark University, 1889-91; Instructor in Biology, University of Wisconsin, 1891–92; Assistant Professor of Physiology and Neurology, Clark University, 1891–1906; Professor of Biology, Clark College, 1902–.

WILLIAM H. BURNHAM, PH.D.

Professor of Pedagogy and School Hygiene — 17 Circuit Ave.

A.B., Harvard University, 1882; Instructor in Wittemberg College, 1882–83; Instructor, State Normal School, Potsdam, N. Y., 1883–85; Fellow, Johns Hopkins University, 1885–86, Ph.D., 1888, and Instructor in Psychology, 1888-89; Docent in Pedagogy, Clark University, 1890–92; Instructor, 1892–1900; Assistant Professor 1900–1906.

ALEXANDER F. CHAMBERLAIN, PH.D.

Assistant Professor of Anthropology — 19 Baker St.

B.A. (1886), M.A.(1889)University of Toronto; Fellow in Modern Languages, University College, Toronto, 1887-90; Librarian, Canadian Institute, Toronto, 1889–90; Fellow in Anthropology, Clark University, 1890–92; Ph.D., Clark University, 1892; Lecturer in Anthropology, Clark University, 1892-1900; Acting Assistant Professor, 1900–04; Bibliographical Editor, *Journal of American Folk-Lore.* Corresponding Member O Instituto de Coimbra, Portugal; Member of the American Antiquarian Society; Honorary Member American Folk-Lore Society; Fellow American Ethnological Society.

MARTIN A. ROSANOFF, SC.D.

Assistant Professor of Chemistry — 7 Downing St.

Ph.B., New York University, 1895; Sc.D., 1908; Student, University of Berlin, 1895–96; University of Paris, 1896–98; Research Fellow, New York University, 1899-1900; Instructor in Theoretical Chemistry, New York University, 1904-05; Assistant Professor of Chemistry 1905–07; Assistant Professor of Organic Chemistry, Clark College, 1907–; Director of Chemical Laboratories.

JOHN WALLACE BAIRD, PH.D. 17 Circuit Ave.

Assistant Professor of Experimental Psychology

A.B., University of Toronto, 1897; University of Leipzig, 1898–99; Fellow, University of Wisconsin, 1899–1901: Fellow, Cornell University, 1901–02; Ph.D., *ibid.*, 1902: Assistant in Psychology, *ibid.*, 1902–03; Carnegie Research Assistant, 1903–04; Instructor in Psychology, Johns Hopkins University, 1904–06: Instructor in Psychology, University of Illinois, 1906–07; Assistant Professor, 1907–February, 1910.

JOSEPH DE PEROTT

Lecturer in Mathematics 5 Hawthorn St.

Student, Universities of Paris and Berlin, 1877–80.

LOUIS N. WILSON, LITT.D. 11 Shirley St.

Librarian of the University and Custodian of the Art Collection

Litt.D., Tufts College, 1905.

BENJAMIN S. MERIGOLD, PH.D.

Instructor in Chemistry 25 Chatham St.

A.B., Harvard University, 1896; A.M., 1897; Ph.D., 1901; Assistant in Chemistry, Harvard University, 1896–1900; Instructor in Chemistry, Worcester Polytechnic Institute, 1900–1903; Assistant Professor of Chemistry, Clark College, 1903–1908; Professor, 1908–.

GEORGE H. BLAKESLEE, PH.D.

Instructor in History 24 Richards St.

A.B., Wesleyan University, 1893; A.M., Harvard University, 1899; Ph.D., 1903; Student, Johns Hopkins University, 1893–94; Parker Fellow, Harvard, 1901–02; Student, Universities of Berlin, Leipzig, and Oxford, 1901–03; Instructor in History, Clark College, 1903–04; Assistant Professor, 1904–09; Professor, 1909–.

FRANK H. HANKINS, PH.D.

Instructor in Economics and Sociology 45 Hollywood St.

A.B., Baker University, 1901; Student, Columbia University, 1903–1904; Scholar in Sociology, 1904–1905; Fellow in Statistics, 1905–1906; Student, 1907–08; Ph.D., Columbia University, 1908; Instructor in Economics, Clark College, 1906–07; Assistant Professor, 1908–.

JOHN CHARLES HUBBARD, PH.D.

Instructor in Physics 8 Loudon St.

B. S. University of Colorado, 1901; Scholar in Physics, Clark University, and Assistant to Professor Webster, 1901-02; Fellow, 1902-04; Ph. D., Clark University, 1904; Instructor in Physics, Simmons College, 1904-05; Asssistant Professor of Physics, New York University, 1905-06; Assistant Professor of Physics, Clark College, 1906–; Honorary Fellow in Physics, Clark University, 1907-09.

JAMES P. PORTER, PH.D.

Instructor in Psychology — 60 Lovell St.

A.B., Indiana University, 1898; A.M., 1901; Instructor in Psychology, Indiana University, 1900–1903; In Charge of Work in Neurology, Indiana University Biological Station, 1891 and 1903; Honorary Fellow in Psychology, Clark University, 1903–09; Ph.D., Clark University, 1906; Instructor in Psychology, Clark College, 1903-07; Assistant Professor, 1907—.

ANNUAL APPOINTMENTS

EDWARD COWLES, M.D., LL.D., Boston

Non-Resident Lecturer on Psychiatry

A.B., Dartmouth College, 1859; A.M., 1863; Medical House Pupil, Retreat for the Insane, Hartford, Conn., 1860–62; M.D., Dartmouth Medical School, 1863; M.D., College of Physicians and Surgeons, New York, 1863; Medical Corps, United States Army, 1863-72; Resident Physician and Superintendent, Boston City Hospital, 1872–79; Medical Superintendent, McLean Hospital, Waverley, Mass., 1879–1903; Lecturer on Mental Diseases, Dartmouth Medical School, 1885–86; Professor of Mental Diseases, *ibid.*, 1886–; Fellow by Courtesy, Johns Hopkins University, 1887-88; Clinical Instructor in Mental Diseases, Harvard Medical School, 1888–; LL.D., Dartmouth College, 1890.

ROBERT HARVEY CLARK, PH.D.

Docent in Chemistry — 28 Hollywood St.

A.B., University of Toronto, 1905; A.M., 1906; Assistant in Chemistry, *ibid.*, 1905–06; Exhibition Science Research Scholar, University of Leipzig, 1906–09; Ph.D., University of Leipzig, 1908; Acting Assistant Professor of Chemistry, Clark College, 1909–.

CHILDREN'S INSTITUTE

THEODATE L. SMITH, PH.D.

Librarian, Children's Institute — 23 Maywood St.

A.B., Smith College, 1882; A.M., 1884; Yale University, 1893–1895; Special Student, Clark University, 1895–96; Ph.D., Yale University, 1896; Cornell University, 1900; Assistant to President Hall in research work under Carnegie grant, Clark University, 1992-04; Estabrook grant, October 1904–February 1905; Berlin University, April-August, 1905; Research Assistant to President Hall, Clark University, 1905-09.

AMY ELIZA TANNER, PH.D., Faribault, Minnesota — 80 Woodland St.

Head of Department of Experimental Pedagogy, Children's Institute

A.B., University of Michigan, 1893; Scholar, University of Chicago, 1894–95; Fellow, 1895–98; Ph.D., University of Chicago, 1898; Associate in Philosophy, *ibid.*, 1898-1902; Professor of Philosophy, Wilson College, 1903-07; Honorary Fellow in Psychology, Clark University, 1907–09.

JOHN A. MAGNI, PH.D. 17 Kilby St.
Head of Department of Child Linguistics, Children's Institute
A.B., Central University of Iowa, 1891; A.M., University of Michigan, 1894; Instructor in Modern Languages, Central University of Iowa, 1890–1893; Vincennes University, 1895–96; Syracuse University, 1903; Massachusetts Agricultural College, February-June, 1908; Scholar in Psychology, Clark University, October, 1907–February, 1908; Fellow, 1908–09; Ph.D., Clark University, 1909.

HARRY WOODBURN CHASE, A.M., Groveland 78 Florence St.
Fellow in Psychology, and Acting Head of Department for Sub-Normal Children, Children's Institute
A.B., Dartmouth College, 1904; A.M., 1908; Fellow in Psychology, Clark University, 1908–09.

DENNIS F. O'CONNOR, M.D. 25 Portland St.
Fellow in Psychology and Consulting Physician, Department for Sub-Normal Children, Children's Institute
A.B., College of the Holy Cross, 1893; A.M., 1899; M.D., College of Physicians and Surgeons, Baltimore, 1898; University of Vienna, 1901–1902.

EDMUND SMITH CONKLIN, A.M. 78 Florence St.
Fellow in Psychology, and Acting Head of Department of Religious Education, Children's Institute
Bachelor of Humanics, Y. M. C. A. Training School, Springfield, Mass., 1908; Scholar in Psychology, Clark University, 1908–09; A.M., Clark University, 1909.

HONORARY FELLOWS

MAX BAFF, M.D.
Honorary Fellow in Psychology 62 Providence St.
M.D., College of Physicians and Surgeons, Columbia University, 1902; Fellow Massachusetts Medical Society; Member American Medical Association; Licentiate in Medicine and Surgery, University of the State of New York; Special Student in Psychology, Clark University, 1908–09.

LUCINDA PEARL BOGGS, PH.D., Urbana, Illinois
Honorary Fellow in Psychology

ARTHUR DEXTER BUTTERFIELD, A.M.
Honorary Fellow in Mathematics 10 Schussler Road
B.S., Worcester Polytechnic Institute, 1893; M.S., 1898; A.M., Columbia University, 1904; Instructor in Civil Engineering, Worcester Polytechnic Institute, 1894–98; Instructor in Mathematics, Engineering Department, University of Vermont, 1898–1900; Assistant Professor, *ibid.*, 1900–04; Professor of Mathematics and Mechanics, *ibid.*, 1904–08; Assistant Professor of Mathematics, Worcester Polytechnic Institute, 1908–; Special Student in Physics and Mathematics, Clark University, 1908–09.

ELNORA WHITMAN CURTIS, A.M.

Honorary Fellow in Psychology — Burncoat St.

A.B., Smith College, 1892; Scholar in Psychology, Clark University, 1907-08; A.M., Clark University, 1908; Honorary Fellow in Psychology, 1908–09.

HOBERT CUTLER DICKINSON, A. M.

Honorary Fellow in Physics — 4 Silver St.

A.B., Williams College, 1900; A.M., 1901; Assistant in Physics and Mathematics, *ibid.*, 1900-02; Scholar in Physics, Clark University, 1902-03; Assistant and Assistant Physicist, Bureau of Standards, Washington, D. C., 1903–.

CHARLES A. S. DWIGHT, PH.D., Winchester

Honorary Fellow in Psychology — 81 Chatham St.

A.B., Yale University, 1881; Student and Graduate, Union Theological Seminary, New York, 1881–1884; A.M., New York University, 1901; A.M., Yale University, 1902; Ph.D., Boston University, 1909.

LOUISE ELLISON, PH.D., St. Louis, Missouri

Research Assistant to Dr. Baird — 2 Woodbine St.

A.B., Washington University, 1906; Scholar in Psychology, Clark Uuiversity, 1906–07; Fellow, 1907–09; A.M., Clark University, 1907; Ph.D., 1909.

KYUGORO ISHIZAWA, PH.D., Hobara, Japan

Honorary Fellow in Economics — 46 Woodland St.

Graduate Waseda University, 1898; LL.B., Chyuo University, 1900; A.M., State University of Iowa, 1904; A.M., University of Wisconsin, 1907; Fellow in Economics, Clark University, 1907–09; Ph.D., Clark University, 1909.

HIKOZO KAKISE, PH.D., Oitaken, Japan

Honorary Fellow in Psychology — 76 Woodland St.

Graduate, Tokyo Imperial University, 1901; Assistant in Psychology, *ibid.*, 1902-06; Fellow in Psychology, Clark University, 1906–07; Research Assistant in Psychology, 1907–08; Research Assistant to Professor Sanford, 1908–09; Ph.D., Clark University, 1909.

ANTONIO LLORENS, Barcelona, Spain

Honorary Fellow in Psychology

Licenciado en Derecho, Universidad de Barcelona; Licenciado en Ciencias, *id.*, Spanish Government's Scholar in Psychology, Clark University, April-June, 1909.

CAREY EYSTER MELVILLE, A.B.

Honorary Fellow in Mathematics — 101 May St.

A.B., Northwestern University, 1901; Fellow in Mathematics, *ibid.*, 1901–02; Graduate Student in Mathematics, Johns Hopkins University, 1902–03; Instructor in Mathematics, Case School of Applied Science, 1903–06; Honorary Fellow in Mathematics, Clark University, 1906–09; Assistant in Mathematics, Clark College, 1906–09; Instructor in Mathematics, Clark College, 1909-.

MAURICE WALTER MEYERHARDT
Honorary Fellow in Psychology 5 Clayton St.

Student at Koelnisches Gymnasium, Berlin, seven years; Special Student in Psychology, Clark University, 1903–04; Scholar 1904–07; Fellow 1907–09.

NEWTON MILLER, PH.D., Thorntown, Indiana
Honorary Fellow in Biology 78 Florence St.

A.B., Indiana University, 1905; A.M., 1906; Fellow in Biology, Clark University, 1906–08; Ph.D., Clark University, 1908; Instructor in Biology, Clark College, 1908–; Honorary Fellow in Biology, Clark University, 1908–09.

CAROLINE AMELIA OSBORNE, PH.D.
Honorary Fellow in Biology 87 Woodland St.

M.D., Woman's Medical College of Pennsylvania, 1899; Superintendent of Nurses, Memorial Hospital, Worcester, Mass., 1899–1904; Instructor of Nurses, *ibid*,. 1904–; Student in Biology, Clark University, 1901–05; Fellow, 1905–06; Honorary Fellow, 1906–09; A.M., Clark University, 1907; Ph.D., 1908.

THOMAS LANSING PORTER, A.M., Evanston, Illinois 8 Loudon St.
Honorary Fellow in Physics and Research Assistant to Professor Webster

B.S., Northwestern University, 1907; Laboratory Assistant in Physics, *ibid*., 1906–07; Research Assistant to Professor Webster, Clark University, 1907–08; A.M., Clark University, 1908; Instructor in Physics, Clark College, 1908–09; Honorary Fellow in Physics, Clark University, 1908–09.

WALTER F. ROBIE, M.D., Baldwinville 105 Pleasant St.
Honorary Fellow in Psychology and Biology

A.B., Dartmouth College, 1889; M.D., Dartmouth Medical School, 1893; Assistant Physician, Hospital Cottages, 1892–94; Supt. Riverview Sanitarium, 1902–07; Pine Terrace Sanitarium, 1907–; Student in Psychology and Biology, Clark University, 1904–1905; Honorary Fellow, 1905–09.

AKIYOSHI SASABE, Tokyo, Japan
Honorary Fellow in Psychology

Graduate, Tokyo Imperial University, 1897; Professor, Tokyo Girls' Higher Normal School, 1900–1909; Special Student in Psychology, Clark University, January–June, 1909.

FRANK BLAIR WILLIAMS, PH.D.

Honorary Fellow in Mathematics — 2 Isabella St.

C.E., University of Missouri, 1890; M.S., 1893; Ph.D., Clark University, 1900; Engineering Work with the Mississippi River Commission, 1890–92; Teaching Fellow in Mathematics, University of Missouri, 1892–93; Survey Work with the Mississipi River Commission, 1894–95; United States Assistant Engineer in Tennessee River Improvement, 1895–97; Scholar in Mathematics, Clark University, 1897–98; Fellow, 1898–1900; Assistant Professor of Civil Engineering, Union College, 1900–05; Assistant Professor of Engineering and Mathematics, 1905–06; Professor of Engineering Mathematics, 1906-07; Assistant Professor of Mathematics, Clark College, 1907–08; Professor, 1908–.

FELLOWS AND SCHOLARS

RUDOLPH ACHER, A.B.

Fellow in Psychology — 101 May St.

A.B., Indiana University, 1908; Fellow in Psychology, Clark University, 1908–09.

CHARLES W. BACON, A.M., North Oxford

Fellow in Chemistry

A.B., Clark College, 1906; Scholar in Chemistry, Clark University, 1906–08; A.M., Clark University, 1907; Assistant in Chemistry, Clark College, 1907–09. Honorary Fellow in Chemistry and Research Assistant to Professor Rosanoff, 1908–09.

GUY GAILLAIRD BECKNELL, M.S., Goshen, Indiana

Fellow in Physics — 18 Gates St.

B.S., Northwestern University, 1904; M.S., 1905; Fellow in Physics, Northwestern University, 1905; Assistant Instructor in Physics, Purdue University, 1905–06; Instructor, 1906–08; Research Assistant to Professor Webster, Clark University, 1908–09.

CHESTER ARTHUR BUTMAN, A.M., Rockport

Fellow in Physics — 8 Loudon St.

Assistant in Physics, Tufts College, 1907-08; Scholar in Physics, Clark University, 1908–09, A.M., Clark University, 1909; Assistant in Physics, Clark College, 1909–.

HERBERT CARROLL COOLEY, A. B., Ypsilanti, Michigan

Fellow in Psychology — 65 Florence St.

B.Pd., Michigan State Normal College, 1906; A.B., 1907; Graduate Student, Boston University, 1907–08; Harvard University, 1908–09.

LUCETTA CRUM, A.M., Logansport, Indiana

Fellow in Psychology — 2 Woodbine St.

Ph.B., Coe College, 1905; Fellow in Clark University, 1908–09; A.M., Clark University, 1909.

BURCHARD W. DEBUSK, A.B.

Fellow in Psychology — 27 Lovell St.

A.B., University of Indiana, 1904; Professor of Philosophy and Education, Southwestern College, Winfield, Kansas, 1904–07; Professor of Philosophy and Psychology, 1907–08; Instructor in Psychology and Acting Director of Experimental Laboratory, Indiana University, 1908–09.

WILLIAM TROWBRIDGE MERRIFIELD FORBES, A.B.

Fellow in Biology — 23 Trowbridge Road

A.B., Amherst College, 1906; Instructor in Biology, Robert College, Constantinople, Turkey, 1906–08; Graduate Student, Cornell University, 1908–09.

ROBERT HUTCHINGS GODDARD, B.S.

Fellow in Physics — 1 Maple Hill

B.S., Worcester Polytechnic Institute, 1908; Instructor in Physics, *ibid.*, 1908–09; Special Student in Physics, Clark University, 1908–09.

ROBERT SINGLETON HART, JR., B.S., Pisgah, Kentucky

Fellow in Chemistry — 78 Florence St.

A.B., State University, Lexington, Ky., 1907; B.S., 1909.

EUCLID HELIE, A.M., Grand Ligne, Quebec

Fellow in Psychology — 2 Winchester Ave.

A.B., McMaster University, Toronto, Canada, 1905; Scholar in Psychology, Clark University, 1905–06; Fellow 1906-09; A.M., Clark University, 1908.

PERCY KENDALL HOLMES, B.P.E., Yarmouth, Nova Scotia.

Fellow in Psychology — 78 Florence St.

B.P.E., Springfield Training School, 1907; Graduate Student, Yale University, 1907–08; Student, Columbia University, 1908–09; Student Instructor in Physical Education, Springfield Training School, 1905–07.

WILLIAM H. HOLMES, JR., A.B., Westerly, Rhode Island

Fellow in Pedagogy — 14 Lowell St.

A.B., Colby College, 1897.

GEORGE ALEXANDER HUTCHINSON, A.M., Bedford, Indiana

Fellow in Psychology — 101 May St.

A.B., Indiana University, 1906; A.M., 1908; Assistant in Psychological Laboratory, *ibid.*, 1907–08; Fellow in Psychology, Clark University, 1908–09.

SAKYO KANDA, A.M., Tokyo, Japan

Fellow in Psychology — 27 Hollywood St.

Graduate, Kansei Gakuin, 1900; Scholar in Psychology, Clark University, 1907–08; Fellow, 1908–09; A.M., Clark University, 1909.

WILLIAM ALDERMAN MATHENY, A.M., Athens, Ohio
Fellow in Biology — 1 Kilby St.

Ph.B., Ohio University, 1908; Assistant in Botany, Clark College, 1908–; Fellow in Biology, Clark University, 1908–09; A.M., Clark University, 1909.

WILLIAM J. MONTGOMERY, A.M.
Fellow in Mathematics — 7 Barbour St.

A.B., Clark College, 1907; Scholar in Mathematics, Clark University, 1907–09; A.M., Clark University, 1908.

RAYMOND KURTZ MORLEY, A.M.
Fellow in Mathematics — 24 Downing St.

A.B. and A.M., Tufts College, 1904; Instructor in Mathematics, University of Maine, 1904–07; Scholar in Mathematics, Clark University, 1907–08; Fellow, 1908–09.

YASUMA NAKAMURA, A.M., Nagasaki, Japan
Fellow in Psychology — 60 Lovell St.

Graduate, Chinzei College, 1903; Fellow in Psychology, Clark University, 1908–09; A.M., Clark University, 1909.

LEONARD BLAINE NICE, PH.B.
Fellow in Biology — 32 Lovell St.

Ph.B., Ohio University, 1908; Assistant in Physiology and Hygiene, Clark College, 1908–; Scholar in Biology, Clark University, 1908–09.

THOMAS FRANCIS POWER, JR., A.M.
Fellow in Chemistry — 10 Tufts St.

A.B., Clark College, 1908; Scholar in Chemistry, Clark University, 1908–09; A.M. Clark University. 1909.

LEROY WALTER SACKETT, A.M., Bloomington, Indiana
Fellow in Psychology — 1 Wilcox St.

A.B., Central Normal College, 1906; A.B., Indiana University, 1908; A.M., 1909; Fellow in Psychology, Clark University, 1908–09.

SIMEON SPIDLE, B.D., Holden
Fellow in Psychology

A.B., Acadia University, 1897; B.D., Newton Theological Institution, 1903; Fellow in Psychology, Clark University, 1908-09.

GEORGE HENRY STEVES, A.M., Onsted, Michigan
Fellow in Psychology — 24 Beaver St.

A.B., University, of Michigan, 1905; Scholar in Psychology, Clark University, 1907-08; Fellow, 1908–09; A.M., Clark University, 1908.

JOHN HOWARD STOUTEMYER, A.B., Onarga, Illinois
Fellow in Psychology 9 Florence St.

A.B., Kalamazoo College, 1905; A.B., University of Chicago, 1906; Graduate Student, University of Chicago, 1905–07; Fellow in Psychology, Clark University, 1908–09.

TADAÏCHI UEDA, Kyoto, Japan
Fellow in Psychology 27 Hollywood St.

Graduate, Doshisha Theological Seminary, Kyoto, Japan, 1907; Student, Union Theological Seminary, 1907–08.

FRANK ELBERT WATSON, A.M., Springfield
Fellow in Biology 23 Maywood St.

B.S., Brown University, 1897; A.M., 1898; Assistant in Comparative Anatomy, Brown University, 1897–99; Fellow in Zoölogy, and Graduate Assistant, University of Nebraska, 1899–1901; Instructor in Biology, De Pauw University, 1905–09.

EDWARD E. WEAVER, A.M., Woonsocket, Rhode Island
Fellow in Psychology 65 Florence St.

A.B., University of Wooster, 1885; A.M., Princeton University, 1889; Graduate, Princeton Theological Seminary, 1889; Fellow in Psychology, Clark University, 1907-09.

HARRY PORTER WELD, PH.B., Nashville, Tennessee
Fellow in Psychology 815 Main St.

Ph.B., Ohio State University, 1900; Graduate in Music, Dennison University, 1900; Professor of Music, Peabody College for Teachers, University of Nashville, 1900–.

CLARENCE DELETTE WRIGHT, A.M., Graniteville
Fellow in Chemistry 41 Hollywood St.

A.B., Clark College, 1908; Fellow in Chemistry, Clark University, 1908–09; A.M., Clark University, 1909; Assistant in Chemistry, Clark College, 1909–.

GEORGE MYRON BARROWS, A.B., Ayer
Scholar in Psychology

A.B., Clark College, 1909.

GEORGE DAVIS BIVIN, A.B.
Scholar in Psychology 58 Lovell St.

A.B., Clark College, 1909.

MARION GENEVIEVE BOLAND, A.B.
Scholar in Psychology 152 Beacon St.

Student, Vassar College, 1898–99; A.B., University of Maine, 1902; Student, Massachusetts, Institute of Technology, 1904–06.

HARRY JOSEPH BUTLER, A.B.
Scholar in Psychology — 6 Lewis St.
A.B., College of the Holy Cross, 1909.

ROLAND PROVOST CARR, A.B.
Scholar in Mathematics — 507 Pleasant St.
A.B., Clark, College, 1909.

THOMAS CHARLES CARRIGAN, A.B.
Scholar in Psychology — 17 Orne St.
A.B., Boston College, 1895.

GEORGE BERNARD CASHEN, A.B.
Scholar in Psychology — 36 Lewis St.
A.B., College of the Holy Cross, 1909.

EDWARD WALTER CLARE, A.B.
Scholar in History — 26 Lincoln St.
A.B., Clark College, 1909; Assistant in History, Clark College, 1909–.

MAUD ETHEL COCHRAN, A.B.
Scholar in Biology — 49 Gates St.
A.B., Mt. Holyoke College, 1909.

ROBERT THOMAS ELLIOTT, A.B.
Scholar in History — 14 Pelham St.
A.B., Amherst College, 1897.

AMY CLENDON FARLIN, A.B., Hyde Park
Scholar in History — 17 Kilby St.
A.B., Boston University, 1909.

WALTER SEWARD FOLEY, A.B.
Scholar in Economics — 14 Woodland St.
A.B. Clark College, 1909.

LOUISE GULICK, A.B., Honolulu, Hawaii
Scholar in Biology — 37 May St.
A.B., Oberlin College, 1909; Teacher of Nature Study, Honolulu Normal School, Territory of Hawaii, 1907–09.

CHARLES ALOYSIUS HANLEY, A.B.
Scholar in Pedagogy — 550 Cambridge St.
A.B., College of the Holy Cross, 1909.

JOHN LEROY HUGHES, A.B., Brookfield
Scholar in Biology

A.B., Clark College, 1909.

ARTHUR WILDER KALLOM, A.B.
Scholar in Psychology 162 May St.

A.B., Clark College, 1909; Assistant in Psychology, Clark College, 1909–.

KARL JOHAN KARLSON, A.B., Myresjo, Sweden
Scholar in Psychology 6 Wyman St.

A.B., Clark College, 1909.

HERBERT K. LARKIN, B.S.
Scholar in Chemistry 29 Oread Place

B.S., Amherst College, 1900.

JOHN MILTON MCINDOO, A.B., Broken Bow, Nebraska
Scholar in Pedagogy 58 Woodland St.

Instructor in English, Antioch College. 1899-1900; A. B., Antioch College, 1900; Instructor in Psychology and Pedagogy, Chattanooga Normal School, 1900-1901; Instructor in Psychology and Pedagogy, Northern Illinois Normal School, 1901-1903; Instructor in Pedagogy and English, Junior State Normal School, Broken Bow, Neb., 1906-09.

JOHN FRANCIS ROCHE, A.B.
Scholar in Psychology 65 Belmont St.

A. B., College of the Holy Cross, 1908.

PAULINE ALLIS SMITH, A.B.
Scholar in History 3 Hudson St.

A. B., Middlebury College, 1906.

J. BRAINERD THRALL, A.B., Leicester
Scholar in Psychology

A. B., Amherst College, 1873; Student, University of Leipzig, 1875-76; Student, Yale Divinity School, 1876-78, Scholar in Psychology, Clark University, 1908-09.

KAZUWO UDO, Kumamoto, Japan
Scholar in Economics 60 Lovell St.

Student in the Chinzei College, 1902; Denver University, 1907-08.

JESSIE LILLIAN WILLIS, A.B.
Scholar in Pedagogy 31 Moore Ave.

A. B., Mt. Holyoke College, 1908.

Mary Dransfield Allis, A.M., Rochester, New York
Student in Anthropology 452 Main St.

B. S., Wellesley College, 1890; A. M., State University of Colorado, 1897.

Winifred N. Bagley, B.S., Burlington, Vermont
Student in Mathematics 21 Dayton St.

B. S., Worcester Polytechnic Institute, 1909; Instructor in Mathematics, *ibid.*, 1909–.

Chester C. Beckley, M.D., Lancaster
Student in Psychology and Psychiatry

M. D., University of Vermont, 1898.

John Merrick Bemis, M.D.
Student in Psychiatry Herbert Hall Hospital.

M.D., University of Vermont, 1893; Special Student in Biology, Clark University, 1899–1900; Special Student in Psychiatry, 1904–09.

Anna L. Brown, M.D., New York City
Student in Psychology

M.D., Northwestern University Medical College, 1894; Special Student in Psychology, Clark University, 1898–99.

James Atkins Bullard, A.B., East Orange, New Jersey
Student in Mathematics 21 Dayton St.

A. B., Williams College, 1908; Instructor in Mathematics, Worcester Polytechnic Institute, 1908–; Special Student in Mathematics, Clark University, 1908-09.

Thomas J. Cross, A.M.
Student in Biology 24 Russell St.

A. B., New Windsor College, 1889; A. M., 1892; Special Student in Psychology, Clark University, 1908-09.

Varnum Pierce Curtis, A.M.
Student in Economics 96 Stafford St.

B. S., Worcester Polytechnic Institute, 1901; C. E., 1905; A. M., Columbia University, 1906; Special Student in Economics, Clark University, 1908-09.

Mary B. Downey, A.M.
Student in History 52 Piedmont St.

A.B., Wellesley College, 1903; A.M., 1908.

Bertha C. Downing, M.D., Arlington
Student in Psychology

Harvard Annex, 1884; M. D., Woman's Medical College of Pennsylvania, 1896; Member of Clinical Staff, New England Hospital, Roxbury, 1900-03; Member of New England Hospital Medical Society; Honorary Fellow in Psychology and Biology, Clark University, 1905-06, Honorary Fellow in Psychology, 1906-07.

Robert John Floody, S.T.B.
Student in Psychology 43 Endicott St.

Graduate, Teachers' Training School, Ontario, 1882; B. S., Albion College, 1890; M. S. 1894; S. T. B., Boston University, 1894; Student in Philosophy, Clark University, 1904-06; Honorary Scholar, 1906-07; Special Student, 1907-09; Member of American Association for the Advancement of Science.

Earle John Harold, B. Litt.
Student in Psychology 33 Baker St.

B. Litt., Earlham College, 1899; Teacher of Education and History, Friends' University, Wichita, Kans., 1900-03; Student, Yale Divinity School, 1903-04.

McLeod Harvey, A.B.
Student in Psychology 5 Oread Place

A. B., Dalhousie College, Halifax, Nova Scotia, 1889; Graduate in Theology, Presbyterian College, Halifax, 1891; Student in Philosophy, Clark University, 1902-06; 1907-08; Special Student in Psychology, Clark University, 1908-09.

Francis P. McKeon, A.B.
Student in Psychology 597 Cambridge St.

A. B., College of the Holy Cross, 1904; J. B., Boston University Law School, 1907.

William Long Mooney, A.B.
Student in Psychology 7 Aetna St.

A. B., College of the Holy Cross, 1909.

Fannie F. Morse, Lancaster
Student in Psychology

William L. Muttart, B.D., Auburn
Student in Psychology

B. D., Bangor Theological Seminary, 1894; A. B., Lebanon University, 1896.

Nellie Mann Opdale, Marlboro
Student in Psychology

Special Student in Psychology, Clark University, 1907-09.

CHARLES MOEN RICE, A.B.
Student in Mathematics — 9 Bowdoin St.
A.B., Harvard University, 1882.

BARBARA ELISABETH ROETHLEIN, Bamberg, Germany
Student in Psychology — 23 Maywood St.
Lehrerinnenexamen in Bamberg am kgl. Lehrerseminar.

LOUISE PLACE ROSANOFF, A.M.
Student in Psychology — 7 Downing St.
A. B., Columbia University, 1896; A. M., 1900.

GEORGE GORDON SAMPSON, A.B.
Student in Economics — 27 Gates St.
A. B., Bates College, 1905.

EDWARD B. SAUNDERS, A. B., Fitchburg
Student in Psychology
B.D., St. Lawrence University, 1900; A.B., 1904; Special Student in Psychology, Clark University, 1906–09.

ANNE FREEMAN SMITH, A.B.
Student in Economics — 3 Hudson St.
A. B., Middlebury College, 1906.

MYRTLE SMITH, M.D.
Student in Psychology — 831 Main St.
M. D., Tufts Medical School, 1905.

WILLIAM EDWARD STORY, JR., PH.D.
Student in Physics — 17 Hammond St.
A.B., Harvard University, 1904; Scholar in Physics, Clark University, 1904–05; Fellow, 1905–07; Ph.D., *ibid.*, 1907; Research Assistant to Professor Webster, 1907–08.

AMELIA WHITING TYLER, A.B., Northampton
Student in Library Methods — 29 May St.
A.B., Smith College, 1895.

Attendants upon Saturday Courses

J. Mace Andress, Worcester
Ira T. Chapman, Millbury
Oliver R. Cook, Worcester
U. Waldo Cutler, Worcester
Helen M. Downey, Worcester
Susan Wilbur Dwight, Worcester
G. Milton Fisher, Worcester
Marion L. Higgins, Worcester
Alfred B. Morrill, Leicester
Etta Sinsabaugh, Springfield
Flora A. Wethered, Worcester

Undergraduates Attending one or more University Courses

Byron W. Barker
Reuben Kaufman
Israel Lurier
Achilles Henry Monat
Harold A. Preston
Harry W. Bugbee
Edmund R. Laine, Jr.
George William Mackay
John W. Oakes, Jr.
Warren McKendree Rasely
Daniel J. Readey

Florence Chandler — 938 Main St.
Bursar, and Clerk of the University

Elizabeth A. Felt — 19 Bowdoin St.
Assistant in the Bursar's office

M. Evelyn Fitzsimmons, S.B. — 28 Hollywood St.
Stenographer

M. Louise Neill, S.B. — 7 Hancock St.
Private Secretary to the President

Instructors	25
Fellows, Scholars and Students	99
Undergraduates	11
Saturday Courses	11
Total	146

ADMINISTRATION

The trustees are the ultimate source of authority in all matters pertaining to the University. They act collectively, through committees, and also through the President of the University.

Duties of the President of the University

The duties of this office were defined by the Trustees, May 23, 1889, as follows:

The President of the University shall consult frequently with the Trustees on all matters that concern the welfare of the University, and attend the meetings of the Board. He shall confer with each instructor concerning the development of his department, determine the duties and authority of each, and preside at the meetings of the Faculty. He shall be the authorized medium of communication between the Board of Trustees and the officers of instruction, individually and collectively, in all matters involving the administration of the University. The enactments of the Board concerning instructors and their work, and all requests, complaints and proposals from the Faculty to the Trustees shall be made known through him. He shall exercise or provide such superintendence over buildings, apparatus, books and other property, as will secure their protection and appropriate use. Expenditures must not be ordered by any instructor of the University without his previous consent or the express authority of the Board.

These duties were more fully defined by By-Laws enacted by the Corporation Sept. 26, 1889. These are as follows:

BY-LAWS

1. The President of the University shall preside on all public academic occasions, shall direct the official correspondence, study the wants and interests of the whole University and exercise a general superintendence over all its concerns. His first care, and that of the authorities of the University, shall be the departments already established, and next those closely related to them; but no other department shall be established until those already introduced have been brought to the highest state of efficiency then possible. All acts, however, which shall involve the expenditure of money in the administration of the University's affairs, shall be subject to the approval of the Board of Trustees or the Finance Committee for the time being.

2. As the efficiency of a University depends chiefly upon the quality of its Faculty, the Board of Trustees will hold the President to a strict but reasonable accountability for the fidelity and ability of each instructor. The President only shall have the power to select and appoint all officers of instruction, subject to the approval of the Board of Trustees. To make wise and well-considered appointments, to maintain harmony within the Faculty, and to increase their efficiency in research and instruction shall be his most important duty. If at any time the President shall be negligent in the discharge of these or other duties, or is from any cause disabled from discharging them, they may be exercised by the Board of Trustees.

3. The President of the University shall be the medium of communication between the Trustees and Instructors, individually and collectively, upon all matters within the field of

action of either body. He shall attend all meetings of the Board of Trustees, of which he shall be notified, and shall participate in their deliberations, but without the power to vote. All complaints and requests from members of one body to the other shall be made through him.

4. The President shall call and preside over all official meetings of the Instructors, and a record of their proceedings shall be kept. These records are in no case to be made known to others than the Trustees. They shall always be in the custody of the President, but may be inspected by the Trustees, or either of them, at any time.

5. The President of the University, in the absence of the Trustees or Finance Committee, shall have the entire direction and control of the persons employed about the University and not engaged in the work of instruction; the duties of all such persons shall be assigned and they shall be appointed or removed by him, subject to the approval of the Finance Committee.

6. No instructor shall order any books or apparatus, or anything connected with the work of instruction (beyond his appropriation), without the approval of the President. No expense for the care of buildings or grounds, nor for alterations or repairs within and upon the same shall be made without the approval of the Board of Trustees or the Finance Committee, such alterations or repairs in no case to exceed the appropriations made for that purpose. If the Trustees, or Finance Committee, or any person shall make contracts in behalf of the University without authority, the officer or person making such contract shall become individually responsible therefor.

7. The officers of instruction shall be appointed for a term of from one to five years. At the end of this period the work of each instructor will be subjected to a careful scrutiny upon the results of which his reappointment shall depend, always provided, however, that any Instructor will be liable to be dis-

charged at any time for incapacity, neglect of duty or for such other cause as shall seem good to the Trustees.

8. Each Instructor shall give stated lectures to however few. He shall actively and zealously strive to maintain the highest possible standard, shall work in a spirit of hearty sympathy and co-operation, and shall encourage research by precept and, if possible, by example.

9. The foregoing By-Laws are intended to embody the provisions contained in a vote passed by the corporation on the twenty-third day of May, A.D. 1889, upon the motion of Judge Devens. (See above.) If at any time hereafter any discrepancy shall be found to exist between the two, said By-Laws shall be so far modified as to conform to the provisions of said vote.

10. No instructor shall engage in any outside professional or technical pursuit without the approval of the Board, the Finance Committee, or the President.

11. These By-Laws, or any one of them, may be changed, amended, or repealed by a vote of three-fourths at least of the Trustees at any meeting of their Board duly called, notified, and held for that purpose.

GENERAL STATEMENTS

The University now consists of nine departments, in which all its work and that of Instructors, Fellows and Scholars, is grouped.

These departments are as follows:

I. Mathematics
II. Physics
III. Chemistry
IV. Biology
V. Anthropology
VI. Psychology
VII. Pedagogy
VIII. Economics and Sociology
IX. History

The Faculty

The Faculty elect Fellows and take action upon general requirements for the Doctor's and Master's degrees and other promotions, act and advise upon whatever may be officially submitted to them by the Board or by the President, and consider all matters not otherwise provided for and in which all departments of the University are alike interested.

Admission

Only graduate students or those of equivalent attainments are admitted to full membership in the University, except in rare and special cases.

At present no entrance examinations are required; but by testimonials, diplomas, personal interviews, or written specimens of work, the authorities must be satisfied that the applicants have scholarship enough to work to advantage, and zeal and ability enough to devote themselves to their chosen field. The methods of the University are too costly, and its energy and funds too precious, to be spent upon those who are not well trained, promising and in earnest.

It is highly desirable that candidates entering any of the nine departments shall have, besides a knowledge of the other subjects commonly taught in colleges, a reading knowledge of French and German.

For the select students who are received, it is the purpose of the University to open all its privileges and to supply every incentive possible in the way of books, facilities, and, above all, direct personal stimulus. The chief as well as the best work of this University is individual and involves daily suggestion, encouragement and direction. The limited number of students permits more or less personal instruction in each case.

Classes of Appointees

No clearly marked line exists between students and instructors. Fellows who have attained some degree of mastery in a special line of work sometimes give brief special courses, which may be attended by professors.

This is a stimulus to the student, and both tests and exhibits power in teaching.

I. DOCENTS

The highest annual appointment not involving membership in the Faculty is that of Docent. These positions are primarily honors, and are reserved for the few whose work has already marked a distinct advance beyond the Doctorate and who wish to engage in research. Docents are not assistants, and their relations are directly with the President of the University.

Docents may be provided with individual rooms and special apparatus may be purchased for their work, if desired and approved. While they will be expected to deliver a limited number of lectures on some special chapter of their department, their time will be mainly reserved for study and research in a way best adapted to qualify them still more fully for academic advancement.

These positions are official appointments made by the Faculty upon nomination of the head of the department and on the following conditions:

1. The candidate must have received the degree of Ph.D. at least one year before he can enter upon the duties of Docentship.

2. That year must have been spent in research and the candidate must have given evidence of his skill and capacity as a teacher by giving a course of lectures, by assisting in the regular work of instruction in this or some other institution of university rank, or in some other satisfactory manner.

3. The candidate must prepare and read in public an habilitation address approved as such by the chief instructor in his department.

4. If these conditions are fulfilled he will receive at the close of his address a diploma granting him the *venia docendi* for the following year in this University and formally attesting his fitness as both scholar and teacher for an academic chair.

5. The fee for this diploma shall be $25, which the Faculty shall have power to remit in case of need.

A memoir or essay representing original work in the department, but no examination, is required. This highest formal academic honor will be strictly reserved for those of marked scientific attainment and teaching ability, and, so far as this diploma can have the significance of a title or degree, it will be regarded by the University as a brevet collegiate professorship.

It is believed that the difficulties under which college trustees sometimes succumb in selecting suitable professors may be diminished by the existence of such a select body of scholars of guaranteed scientific training, ability, and approved power to teach, and that otherwise this new grade will aid in raising the standard of academic scholarship in colleges and in encouraging scientific research here. Appointees of this class may be paid a small salary.

II. LECTURERS

Those who have already taken the degree of Doctor of Philosophy or who are under appointment as Fellows may on recommendation of the head of the department, be designated to give a number of lectures upon topics in which they have attained special competency.

III. HONORARY FELLOWS

Those who have already advanced to the Doctor's degree may be appointed Honorary Fellows and given the privileges of the University, including those of the Library. In past years many who have already taken this degree, either in this country or abroad, and who are awaiting academic appointment, have found these positions both helpful for their own further research and development and also advantageous for obtaining the collegiate and university appointments that they seek.

IV. CANDIDATES FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

Candidates for the Doctor's degree must have previously taken the Degree of Bachelor of Arts or have had a substantial equivalent for the training implied by that degree.

At least one year, but in most cases three years, of graduate work are necessary for this degree. Examinations for it, however, may be taken at any time during the academic year when, in the judgment of the University authorities, the candidate is prepared, provided the requirement of one year's residence has been absolved.

For this degree one requirement is a dissertation upon an approved subject, to which it must be an original contribution of value. To this capital importance is attached. It must be reported on in writing by the chief instructor before the examination, printed at the expense of the candidate, and at least one hundred copies given to the Uni-

versity. However, in case of a dissertation of unusual length, or containing expensive plates, the Faculty shall have power, at the request of the candidate, to reduce this number of presentation copies to fifty.

Such formal or informal tests as the Faculty may determine shall mark the acceptance of each student or Fellow as a candidate for this degree. One object of this preliminary test shall be to insure a good reading knowledge of French and German. Such formal candidature shall precede the examination itself by a period prescribed in the special rules below.

The fee for the Doctor's degree is $25, payable before the examination. The presentation copies of the dissertation must be in the hands of the Librarian before the diploma is delivered. In exceptional cases, and by special action of the Faculty, the act of promotion may precede the presentation of the printed copies of the dissertation.

An oral, but no written, examination is required upon at least one minor subject in addition to the major before an examining jury composed of at least four members, including the head of the department and the President of the University, who is authorized to invite any person from within or without the University to be present and to ask questions. The jury shall report the results of the examination to the Faculty, who will recommend satisfactory candidates for the degree.

For the bestowal of this degree, the approbation of the Board of Trustees must in each case be obtained by their signature upon the diploma. They desire that the standard of requirements for it be kept the highest practicable, that it be reserved for those of superior ability and attain-

ment only, and that its value be never suffered to depreciate.

It is to the needs of candidates for this degree that the lectures, seminaries, laboratories, collections of books, apparatus, etc., are especially shaped, and no pains will be spared to afford them every needed stimulus and opportunity. It is for them that the Fellowships and Scholarships are primarily intended, although any of these honors may be awarded to others.

On November 14th, 1900, the following vote was passed by the Board of Trustees:

That the University will admit candidates for the degree of Doctor of Philosophy and will confer that degree without regard to sex.

Special Rules Concerning the Doctor's Degree

I. *Residence.* No candidate shall receive the degree of Doctor of Philosophy without at least one academic year's previous residence.

II. *Candidature for the Doctor's Degree.* Every applicant for the Doctor's degree shall fill out, before October fifteenth, the regular application blank provided at the office. This schedule shall be submitted to the head of the department. Before affixing his signature he shall satisfy himself, in such manner as he may desire, as to the fitness of the applicant.

III. When countersigned, this schedule shall be filed with the President, and the applicant will be examined in French and German by the annual committee for that purpose.

IV. In case of a favorable report by this committee, the applicant shall be a regular candidate for the degree.

V. Candidates complying with all preliminary conditions, including the examinations in French and German, before November first will be allowed to proceed to the doctor's examination at any time between May fifteenth following and the end of the academic year.

VI. *The Doctor's Dissertation.* The dissertation must be presented to the instructor under whose direction it is written, and reported upon by him before the doctor's examination. In every case the dissertation shall be laid before the jury of examination, at the time of examination, in form suitable for publication. This provision shall not, however, preclude the making of such minor changes later as the chief instructor may approve.

VII. The dissertation shall be printed at the expense of the candidate and the required copies deposited with the Librarian within one calendar year after the first of October following the examination. The candidate alone will be held responsible for the fulfilment of these conditions.

VIII. The favorable report of the chief instructor, filed in writing with the Clerk of the University, shall be a sufficient imprimatur or authorization for printing as a dissertation. The printed copies shall bear upon the cover and title page the statement of approval in the following words, over the signature of the chief instructor:

> A Dissertation submitted to the Faculty of Clark University, Worcester, Mass., in partial fulfilment of the requirements for the degree of Doctor of Philosophy, and accepted on the recommendation of
>
> (NAME OF CHIEF INSTRUCTOR)

IX. *Examinations for the Doctor's Degree.* The examinations for the doctor's degree may be held at any time during the academic year, provided that at least one academic year has elapsed since the completion of the preliminaries of candidature, except in the case of fulfilment of these conditions between the beginning of any academic year and November first of that year, to which case Rule V applies. The examinations shall be held at such hours and places as the President may appoint.

X. Examinations may also be held during the regular vacations of the University, but for these an additional fee of five dollars to each examiner and the reasonable travelling expenses of any examiners who are out of town, all payable in advance, will be required.

V. DEGREE OF MASTER OF ARTS

This degree is conferred upon candidates who comply with the following requirements:

1. The candidate shall have previously taken the degree of Bachelor of Arts, or have had a substantial equivalent for the training implied by that degree, to be determined by special vote of the Faculty; but such degree or training must involve a good preparation for the work proposed for the Master's degree, in order that it may be accepted.

2. The candidate must devote a full academic year to post-graduate work in this University after receiving the Bachelor's degree or the training accepted as its equivalent. This work shall be mainly in one department, but the candidate may do also such other work as

shall be advised by the head of his principal department, —whose approval of the whole course shall be necessary. In particular cases, the candidate may be allowed, by special vote of the Faculty, to divide his work between two years; but the aggregate must, in all cases, amount to a full year's work, at least.

3. The candidate must satisfy the representatives of his principal department that he has done his work faithfully and has mastered the subjects involved, by such written and oral examinations and other tests as the department may require. The head of the department shall make a written report to the Faculty of the grounds on which the candidate is recommended, specifying the amount and character of his work. and this report shall be filed in the office.

4. The candidate must present a thesis or written report on some topic included in his course or closely related to it, that shall receive the approval of the representatives of his principal department, be accepted by the Faculty, and filed in the office.

5. Every candidate recommended for the Master's degree shall pay a fee of ten dollars.

6. The Master's degree will be conferred at the annual commencement in June of any year on those candidates only who shall have made written application to be considered as such on or before January 15th preceding and shall have fulfilled all the conditions here specified at least one week before Commencement, at which time the academic year shall be regarded as ending for the purposes of section 2.

VI. SPECIAL STUDENTS NOT CANDIDATES FOR A DEGREE

Any one desiring to undertake a special and approved line of research, and whose attainments are such as to satisfy the requirements of the University, may also be received. This class includes persons who may desire to devote themselves exclusively to one or more of the special branches—mathematics, physics, chemistry, biology, anthropology, psychology, pedagogy, economics and sociology, or history,—but who do not care to matriculate or become candidates for a degree.

These students, provided they satisfy the heads of the departments of their training and competency in one subject, in which they must be advanced (although they may be less so, or even beginners, in other subjects), may be allowed entire freedom in their choice and combination of studies, and as special students may enjoy all the privileges of the University.

These students may, with the approval of the President, be received for less than an entire year.

VII. PRELIMINARY CANDIDATES

Non-university students of less special or less advanced standing than the above classes, who contemplate becoming candidates for some higher degree, may also be received.

Students of this class must satisfy the authorities of the University of their attainments and that they contemplate advancing to a degree higher than that of A.B. The privileges and status of these students will be more

fully defined later. They may, in exceptional cases, be elected to Scholarships.

Fellowships and Scholarships

From the George F. Hoar Fund of $100,000 provided by the generosity of Andrew Carnegie, the sum of $3,000 is now available for Junior and Senior Fellowships in the University. While the sums attached to these appointments are not fixed, a Senior Fellow may receive $200 together with the remission of fees; which makes the value of the appointment $300. A Junior Fellow may receive $100 with remission of fees, which makes the value of the appointment $200. Besides these, other appointments of Senior and Junior University Scholarships, with remission of fees, are made.

A citizen's fund

A citizen of Worcester has given a fund of $5,000, the income of which is to be used for the aid of "some one or more worthy native born citizens of the city of Worcester who may desire to avail themselves of the advantages of the institution."

The field fund

Mrs. Eliza W. Field has also given $500 to be called the "John White Field Fund," the income of which is "to provide for the minor needs of a Scholar or Fellow."

The following regulations apply to the award of the income of the Field Fund:

1. Regard is had to the intellectual ability of the candidate as well as to need of pecuniary assistance.

2. Only candidates who have spent three months at the University are considered.

3. The head of each department will consider and report to the Faculty desirable cases in his department.

4. Applications are received not later than December 15th, and the awards made as soon as possible after the Christmas recess.

THE ELIZA D. DODGE FUND

Mrs. Dodge has given $1,000 to be known as the "Eliza D. Dodge Fund," the income only to be expended in aid of graduate students of limited means engaged in research work.

PURPOSE AND CONDITIONS OF FELLOWSHIPS AND SCHOLARSHIPS

Fellowships at Clark University are intended for young men and women of promise who desire to pursue post-graduate studies in order to fit themselves for intellectual careers. It is desirable, but not required, that candidates for these positions should intend to proceed to the degree of Doctor of Philosophy or to equivalent attainments. In general, those intending to devote themselves to some special branch of learning are preferred to those directly fitting themselves for one of the three learned professions, although the latter are not excluded.

No application blanks are provided, but it is desired that the candidate should state fully and in writing his

previous course of study and submit testimonials or diplomas, especially such as indicate a decided preference for some particular department. These should be accompanied also, if practicable, by some specimen of the candidate's work. Applications will be considered in May and in October and should be in the hands of the President on or before the first day of either month. In special cases vacancies may be filled by appointments at any time during the year. The names of unsuccessful candidates will not be made public.

Fellows must reside in Worcester during the entire academic year, devote themselves to special studies under the direction of their instructors, and give such evidence of progress or proficiency before the end of the year as the authorities shall require. It is generally expected that they will undertake some work of research during the year. They must coöperate in promoting harmony, order, and all the ends of the University, must not teach elsewhere, and may be reappointed at the end of the year. Being intended primarily as honors, both Fellowships and Scholarships are awarded without reference to pecuniary needs, so that those able and desiring to do so may relinquish the emolument and retain the title of "Scholar" or "Fellow."

The paying fellowships will, for the present, be restricted to the departments of mathematics, physics, chemistry, biology, psychology, pedagogy, anthropology, economics, and history.

Methods

Besides field work, excursions to institutions (public and private), coaching and cram classes, clubs, examina-

tions, and other modes by which knowledge now seems best imparted and retained, the following educational methods are prominent:

Lectures. The Trustees desire that each instructor, of however few students, should prepare and deliver regular lecture courses, with diagrams, illustrative apparatus, and reference to standard text-books and the best current literature upon each topic. Advanced students are also encouraged to supplement the work of the professors by giving occasional special lectures and courses. Public lectures will be given from time to time.

Seminaries and Conferences. These are stated meetings for joint systematic work, under the personal direction of the professor, in some special part of his subject. Here students preparing theses and other papers for publication in the journals edited at the University read them in incomplete form for mutual criticism and help. Here, also, the results of individual reading are reported for the benefit of all; views are freely criticised; new inquiries, methods, comparisons, standpoints, etc., suggested. From the mutual stimulus thus given many important works have proceeded and the efficiency of universities has been greatly increased.

Laboratory Work. For beginners this has been from the first the best of all forms of apprenticeship, bringing student and professor to a closer and mutually stimulating relation. Here the manipulation of apparatus is learned, processes are criticised, results obtained by other investigators are tested, and methods discussed and perfected, with a view to developing that independence in research which is the consummation of scientific culture.

The charge for tuition, giving all the privileges of the University, but not covering the laboratory fees, is $100 per annum.

Board and lodging can be obtained near the University at very moderate rates.

Intending students will be given information, so far as possible, upon any of these or other points, in advance of official announcement, upon addressing the Clerk of the University, Miss Florence Chandler, Worcester, Mass.

All members of the University are expected to be present at the opening of each term and to continue in attendance to its close.

The following are the statements and announcements of the departments for the academic year, 1910-1911.

I. MATHEMATICS

Programme for 1910-1911

INSTRUCTION IN MATHEMATICS

The chief aim of the department is to make independent investigators of such students as have mathematical taste and ability; these naturally look forward to careers as teachers of the higher mathematics in colleges and universities, and we believe that the course of training best adapted to the development of investigators is also that which is most suitable fo all who would be efficient college professors, even if they are not ambitious to engage in research. The first essential of success in either of these lines is the habit of mathematical thought, and the direct object of our instruction is the acquisition of this habit by each of our students. With this end in view, we expect every student to make himself familiar with the general methods and most salient results of a large number of different branches of mathematics, conversant with the detailed results and the literature of a few branches, and thorough master of at least one special topic to the extent of making a real contribution to our knowledge of that subject.

In accordance with these principles, the instruction is given by means of introductory, advanced, and special courses of lectures, seminaries, and personal guidance in reading and investigation.

The introductory courses (mostly given in alternate years) treat the following subjects:

Analytic Geometry of Higher Plane Curves, Higher Surfaces, and Twisted Curves; 5 hours a week, through the year.

Differential Equations, and Calculus of Variations; 5 hours a week, through the year.

Theory of Functions of Real and Imaginary Variables, Elliptic Functions, and Definite Integrals; 5 hours a week, through the year.

Theory of Numbers; 2 hours a week, one half-year.

Modern Synthetic Geometry; 2 hours a week, one half-year.

Algebraic Substitutions and their Application to the Theory of Equations; 2 hours a week, one half-year.

Algebraic Invariants; 2 hours a week, one half-year.

Finite Differences; 2 hours a week, one half-year.

It is expected that every student will take each course in the earliest year of his residence in which it is given, unless he has already completed an equivalent course elsewhere. The chief object of these courses is to make the student familiar with the various methods of mathematical research and the concepts of mathematical thought at the present day. Thus, for example, curves and surfaces are treated by modern methods from the beginning, with adequate consideration of the discoveries of the great geometers of recent times. The usual college courses in the theory of algebraic equations, analytic geometry, and the differential and integral calculus furnish all the necessary preparation for these introductory courses, although it is very desirable that the student be acquainted with the properties of determinants and their application to the solution of linear equations, and with the methods of solving differential equations of the simpler types. Deficiencies in these subjects may be made up by attendance on the corresponding courses in the Collegiate Department of the University.

A Seminary will be conducted in connection with the introductory courses, in which the students will be exercised in individual investigation and the oral presentation of results.

The literature of the topics discussed will here receive adequate attention.

Special advanced courses, open to such as have nearly or quite completed the introductory courses, are given annually in subjects varying with the interests of the instructors and the needs of the students.

Each advanced student is placed under the supervision of one of the instructors for guidance in the original investigation of some special topic; the successful issue of this investigation may furnish material for the dissertation required for a candidate for the degree of Doctor of Philosophy.

For the academic year 1910-1911, the following courses are offered:

BY PROFESSOR STORY

Introductory Course:

ANALYTIC GEOMETRY OF HIGHER PLANE CURVES, HIGHER SURFACES, AND TWISTED CURVES; 5 hours a week, through the year.

Introductory and Advanced Course:

FINITE DIFFERENCES; 2 hours a week, through the year.

Advanced Course:

HISTORY OF MATHEMATICS; 2 hours a week, first half-year.

SEMINARY FOR ADVANCED STUDENTS; through the year.

BY PROFESSOR TABER

Introductory Course:

THEORY OF FUNCTIONS OF REAL AND IMAGINARY VARIABLES, ELLIPTIC FUNCTIONS, AND DEFINITE INTEGRALS; 5 hours a week, through the year.

Advanced Courses:

THEORY OF BILINEAR FORMS; 2 hours a week, first half-year.

THEORY OF INTEGRAL EQUATIONS; 2 hours a week, second half-year.

SEMINARY, through the year.

BY PROFESSOR WEBSTER

[See announcement of Department of Physics, courses 10, 11, 13, 14.]

BY M. DE PEROTT

Introductory Course:

THEORY OF NUMBERS; 2 hours a week, first half-year.

Advanced Course:

ABELIAN INTEGRALS; 2 hours a week, second half-year.

During the academic years 1889-1910 advanced and special courses have been given in:

1. THE HISTORY OF MATHEMATICS among various peoples from the earliest times to A. D. 1650.
2. THEORY OF NUMBERS.
3. LINEAR TRANSFORMATIONS AND ALGEBRAIC INVARIANTS, with applications to algebraic equations and geometry.
4. THEORY OF SUBSTITUTIONS, with applications to algebraic equations.
5. PLANE ANALYTIC GEOMETRY.
6. SOLID ANALYTIC GEOMETRY.
7. HYPERSPACE AND NON-EUCLIDIAN GEOMETRY.
8. ENUMERATIVE GEOMETRY.
9. QUATERNIONS, with applications to geometry and mechanics.
10. MULTIPLE ALGEBRA, including matrices, quaternions, the "Ausdehnungslehre," and extensive algebra in general.
11. MODERN SYNTHETIC GEOMETRY.
12. THEORY OF FUNCTIONS according to Cauchy, Riemann, and Weierstrass, with applications.
13. WEIERSTRASS'S THEORY OF ELLIPTIC FUNCTIONS.
14. ABELIAN FUNCTIONS AND INTEGRALS.
15. NUMERICAL COMPUTATIONS.
16. THEORY OF QUADRATIC FORMS.
17. ANALYSIS SITUS, (the connectedness of surfaces, etc.).
18. SURFACES OF THE THIRD AND FOURTH ORDERS (analytically treated).
19. PLANE CURVES OF THE THIRD AND FOURTH ORDERS (analytically treated).
20. KLEIN'S ICOSAHEDRON-THEORY.
21. ELLIPTIC MODULAR FUNCTIONS.

22. Theta-Functions of Three and Four Variables.

23. Riemann's Theory of Hyperelliptic Integrals.

24. Symbolic Logic.

25. Twisted Curves and Developable Surfaces (torses).

26. Rational and Uniform Transformations of Curves and Surfaces.

27. Theory of Functions of a Real Variable.

28. Definite Integrals and Fourier's Series.

29. Ordinary Differential Equations, including differential equations with infinitesimal transformations, general theory of linear differential equations, Gauss', Legendre's, and Bessel's functions.

30. Partial Differential Equations, including Laplace's, Bessel's and Lamé's functions.

31. Finite Differences and Probabilities.

32. Applications of the Infinitesimal Calculus to the Theory of Surfaces.

33. Simultaneous Equations, including Restricted Systems.

34. Theory of Transformation Groups.

35. The Application of Transformation Groups to Differential Equations.

36. Theory of Errors.

The advanced and special courses are not repeated at regular intervals, but properly prepared students will receive the personal assistance of one or other of the instructors in reading any subject not announced for the year in which they desire to take it.

The number and scope of the advanced courses given each year have been, thus far, regulated by the number of students qualified to profit by them and by the individual interests of the instructors; these courses will be increased, both in number and variety, whenever a real demand for such an increase shall make itself apparent. While the present purely scientific character of the University precludes instruction in strictly technical branches, we hope that the time is not far distant when the demand shall make it advisable, and increased facilities shall make it possible, to announce courses in Decriptive Geometry, Graphical Statics, Mathematical Astron-

omy, Vital Probabilities, and all the more important applications of mathematics to other sciences and to technical subjects. The applications of mathematics to physics already receive adequate consideration, and the further extension of such applications awaits only a demand for it on the part of students.

Each year seminaries for the training of students in methods of investigation are conducted by the several instructors, and those who have attained the necessary proficiency are personally directed in individual researches, of which the results are published in various mathematical journals.

The degree of Doctor of Philosophy is conferred upon such students as have completed all the introductory courses and a satisfactory number of advanced and special courses, have presented approved memoirs embodying the results of original investigation, and have passed creditable examinations in their principal department of study and in one subordinate department. Mathematical students are generally advised to offer theoretical physics as their subordinate subject, and facilities are given for acquiring the requisite knowledge of this subject during their first and second years at the University. Three years of University work are ordinarily necessary to obtain the degree.

The degree of Master of Arts will be conferred upon students who complete with credit an approved course of one year and present a satisfactory thesis.

Every facility for the study of special branches will be given to properly prepared students who are not candidates for the doctor's degree, and to those who, having already taken the degree (here or elsewhere), wish to continue mathematical study or investigation.

The Library is provided with the more important text-books, treatises, and memoirs on the various branches of mathematics, as well as the principal journals and transactions of learned societies that are devoted to any considerable extent to mathematics. Among the periodicals are the following:

Acta mathematica. Stockholm, Berlin and Paris, 1882 to date. Complete.

American association for the advancement of science. Proceedings, 1848 to date. Complete.

American journal of mathematics. Baltimore, 1878 to date. Complete.

American Mathematical Society.

Bulletin. 1894 to date. Complete.

Transactions. 1900 to date. Complete.

Amsterdam. Koninklijke akademie van wetenschappen. Verhandelingen, 1854 to date. Complete.

Annali di matematica, pura ed applicata. Milano, 1889 to date.

Annals of mathematics. 1884 to date. Complete.

Archiv der mathematik und physik. 1901 to date.

Berlin. Königlich-preussische akademie der wissenschaften. Mathematische und naturwissenschaftliche mittheilungen aus den sitzungsberichten. 1882-97. Complete.

Berliner mathematische gesellschaft. Sitzungsberichte. 1902 to date. Complete.

Bibliotheca mathematica. Stockholm, Berlin and Paris, 1884 to date. Complete.

Bologna, Istituto di. Reale academia delle scienze.

Commentarii. 1731-1791. Complete.

Novi commentarii. 1834-1849.

Memorie fis. e mat. 1806-1810.

Memorie. 1850 to date. Complete.

Boston. American academy of arts and sciences. Proceedings, 1870 to date. Complete.

British association for the advancement of science. Report. 1831 to date. Complete.

Brussels. Académie royale des sciences des lettres et des beaux-arts de Belgique.

Bulletins. Ser. 3. 1889 to date.

Mémoires couronnés et mémories des savants étrangers. 1889-90.

Bulletin des sciences, mathématiques et astronomiques. Paris, 1870 to date. Complete.

Cambridge philosophical society.

Proceedings. 1843 to date. Complete.

Transactions. 1822 to date. Complete.

Colorado, University of. Studies. 1902 to date. Complete.

Deutsche mathematiker-vereinigung. Jahresbericht. Leipzig, 1890, to date. Complete.

Edinburgh philosophical journal. 1819-1826.

Edinburgh. Royal Society. Transactions. 1873 to date. Complete.

Fortschritte der mathematik, Jahrbuch über die. Berlin, 1868 to date. Complete.

France, Société mathématique de. Bulletin. Paris, 1873 to date. Complete.

Göttingen. Königliche gesellschaft der wissenschaften. Nachrichten von der k. gesellsschaft der wissenschaften und der Georg-Augusts-universität. 1853 to date.

Haarlem. Hollandsche maatschappij der wetenschappen. Archives néerlandaises des sciences exactes et naturelles. 1866 to date. Complete.

International catalogue of scientific literature. 1902 to date. Complete.

Internationale mathematiker-congresse. Verhandlungen. 1897 to date. Complete.

Journal de mathématiques pures et appliquées. Paris, 1836 to date. Complete.

Journal für die reine und angewandte mathematik. Berlin, 1826 to date. Complete.

Leipzig. Königlich-sächsische gesellschaft der wissenchaften.

Berichte über die verhandlungen der mathematisch-physischen classe. 1849 to date. Complete.

Abhandlungen der mathematisch-physischen classe. 1852 to date. Complete.

Liège. Société royale des sciences. Mémoires. 1843 to date. Complete.

London mathematical society. Proceedings. 1865 to date. Complete.

London. Royal society.

Proceedings. 1800 to date. Complete.

Philosophical transactions. 1665 to date. Complete.

Mathematische annalen. Leipzig, 1869 to date. Complete.

Messenger of mathematics. Oxford, Cambridge and Dublin, 1862 to date. Complete.

Milan. Reale istituto lombardo di scienze e lettere.

Classe di scienze mathematiche e naturali. Rendiconti. 1864-67. Complete.

Rendiconti. 1868 to date. Complete.

Memorie. 1843 to date. Complete.

Monatshefte für mathematik u. physik. Wien, 1908.

New York mathematical society. Bulletin. 1891-94. Complete.

Nouvelles annales de mathématiques. Paris, 1842 to date. Complete.

Paris. Institut de France. Académie des sciences. Comptes rendus hebdomadaires des séances. 1835 to date. Complete.

Paris. Annales scientifiques de l'école normale supérieure. 1864 to date. Complete.

Paris. École polytechnique. Journal. 1794 to date. Complete.

Philosophical magazine. London, Edinburgh and Dublin, 1798 to date. Complete.

Quarterly journal of pure and applied mathematics. London, 1857 to date. Complete.

Revue semestrielle des publications mathématiques, rédigée sous les auspices de la société mathématique d'Amsterdam. 1893 to date. Complete.

Rome. Reale accademia dei lincei. Atti. Rendiconti.

Tokyo. Mathematico-physical society. Proceedings (Tôkyô sûgaku-buturigakkwai kizi) 2d Ser. 1901 to date. Complete.

Vienna. Kaiserliche akademie der wissenschaften. Sitzungsberichte der mathematisch-naturwissenschaftlichen classe. 1848 to date. Complete.

Zeitschrift für mathematik und physik. Leipzig, 1856 to date. Complete.

Zeitschrift für mathematische und naturwissenschaftliche unterricht. 1903 to date.

The department possesses a set of Brill's admirable models and Björling's thread models of developable surfaces.

The department possesses also:

An Amsler Planimeter (with revolving table) and a Thomas Arithmometer.

II PHYSICS

Professor Webster will deliver the following lectures. In order to meet the convenience of students, and to prevent the necessity of waiting for the logical beginning of the cycle, the regular courses are repeated with a cycle of two years. These embrace the subjects that are indispensable, and the pursuit of them will fit the student to read and study any memoirs on mathematical physics. The courses are so arranged that, although they follow in order, it is possible for a student to begin in either year of the cycle. The regular courses are not marked with a star, and constitute a course of from five to seven hours weekly. The starred courses are delivered at irregular intervals, according to the demands or the presence of students of sufficient advancement.

LECTURES

1. Dynamics. General Principles, Equations of Lagrange and Hamilton, Methods of Hamilton and Jacobi, Systems of Particles, Rigid Bodies.

This course is fundamental for the pursuit of all the others, and includes a detailed account of the principle of Least Action and the differential equations of Lagrange, preparatory to their application to other parts of mathematical physics such as optics and electricity.

2. Newtonian and Logarithmic Potential Functions, Attraction of Ellipsoids.

This course is a necessary preliminary to the study of electricity and magnetism, of hydrodynamics, and of the figure of the earth.

3. Elasticity, Hydrodynamics, Wave and Vortex Motion, Dynamical Basis of Sound and Light.

This course is the basis of applications of the theory of wave motion to sound, light, electro-magnetism, and earthquake waves, and to the study of meteorology.

3a. * Dynamics of Cyclic and Oscillatory Systems, with Applications to the Theory of Electricity, Sound and Light.

The substance of the preceding courses is contained in Professor Webster's Treatise on Dynamics, B. G. Teubner, Leipzig.

3b. * The Theory of Resonance with Applications to the Measurement of Sound and to Wireless Telegraphy.

This course takes up Professor Webster's original researches in acoustics, and also shows how the methods there employed bear on the fundamental electrical phenomena involved in wireless telegraphy.

4. Electricity and Magnetism. The Classical Theories and the Theory of Maxwell, with an account of the principal methods for the solution of problems and applications to absolute measurements.

The substance of this course is found in Professor Webster's Mathematical Treatise on the Theory of Electricity and Magnetism, London, Macmillan & Co.

4a. * Recent Developments in Electrical Theory, including the Theory of Lorentz.

The application to the theory of Electrons and to the optics of bodies in motion.

5. The Theory of Light. Propagation of Light, Diffraction, Reflection and Refraction, Dispersion, Double Refraction, Polarization, Metallic Reflection, Magneto-optics.

5a. * Comparison of Theories of the Ether.

Critical and historical examination of the various mechanical explanations of the luminiferous ether, including those of Green, McCullagh, Kelvin, Maxwell, Sommerfeld and Larmor.

5b. * Geometrical Optics. Properties of Systems of Rays, and their Various Aberrations. Hamilton's Characteristic Function or Eikonal. Applications to Optical Instruments.

6. Thermodynamics. Thermo- and Electro-Chemistry.

The establishment of the two laws of Thermodynamics, and their application, by means of the methods of Gibbs and Helmholtz, to the examination of physical and chemical phenomena. Application to heat-engines, including steam, gas, and oil engines, the flow of gases and vapors, and the steam turbine. The conditions of chemical equilibrium, phenomena of electrolysis, osmotic pressure, and capillarity.

7. The Kinetic Theory of Gases. The Maxwell-Boltzmann Theorem and the Elements of Statistical Mechanics.

8. * The Theory of Radiation and of a Black Body.

The relations obtained from the laws of Kirchhoff, Stefan, Wien, and Planck, by the recent application of Thermodynamics.

9. * The Phenomena of Conduction of Electricity in Gases, and of Radioactivity, and their Bearing on the Structure of the Atom.

10. The Partial Differential Equations of Mathematical Physics.

Laplace's Equation, Equation of Thermal and Electrical Conduction, Equation of Wave-motion, Helmholtz's Equation, Beltrami-Lorentz Equation, Telegrapher's Equation, and their special cases; methods of Cauchy, Green and Riemann; Normal functions, Developments in Series, Fourier's Series, Legendre's, Laplace's, Bessel's and Lamé's functions.

This course is one of the most important for the physicist, and treats a great variety of subjects from the most varied fields, grouping them all into a connected system, and embracing all the methods of theoretical physics.

11. * The Elements of Integral Equations, and their application to Mathematical Physics.

12. * Selected Chapters in the Application of Theoretical Physics to Cosmical Phenomena. including Problems in Geodesy, the Tides, Meteorology, Seismology, and Terrestrial Magnetism.

13. * Linear Differential Equations.

The applications of the theory of functions to the linear differential equations of the second order which arise in mathematical physics.

14. * Orthogonal Surfaces and Curvilinear Coordinates and their Applications.

The courses for 1910-11 will be 1, 2, 3, 4. During the past year 5, 5a, 6, 7, 8, 10 have been given.

Dr. Hubbard has, during the present year, conducted a course in Thermodynamics supplementary to Professor Webster's lectures, intended for the needs of chemical students following those lectures, and with the object of lightening some of the mathematical difficulties of the subject.

In addition to the above formal courses there is held a weekly Colloquium, or meeting for the informal discussion of subjects not treated in the lectures, and for the presentation by the students of reports on important articles appearing in the journals. A part of the work of the colloquium consists in the systematic presentation of certain classical researches, more

or less connected with the lectures, in preparing which the students make use of the original sources of information, thus gaining much acquaintance with the methods of the masters in research. The work of the colloquium has an excellent effect in training students to present their ideas in a systematic manner before an auditory.

The facilities without which no graduate department of research in pure and applied physics can be complete are comprised under three heads: first, a systematic course of lectures in theoretical or mathematical physics; second, a laboratory with a sufficient number of rooms for individual work and with a sufficient equipment of apparatus and an instrument shop for the speedy production of whatever may be necessary for the research in hand; third, a library containing the classic works on physics, with full sets of journals by which the history of progress, past and present, may be studied, and kept up to date by the continual purchase of the latest works. In all these directions the facilities offered by this department invite attention.

Among the various lines of investigation now attracting the attention of the physicists the following are preeminent in importance. First, the interrelations between the liminiferous ether and ordinary matter, and the modifications necessary to be made in Maxwell's theory in order to explain the known optical and electrical phenomena of bodies in motion, and that aspect of the theory which deals with the properties of the small electric bodies known as electrons. This portion of mathematical physics is extremely new, and has hardly begun to appear in university courses in this country. Second, the structure of the atoms of matter, to which the subjects of spectroscopy and the new and fascinating field of radio-activity give the most promising clew. Third, the thermodynamics of radiation in general, which is most intimately connected with the first, and about which a similar remark may be made as to the lack of instruction.

Of branches of applied physics now awaiting the attention. of the mathematical physicist may be mentioned meteorology, seismology, and geophysics in general, in all of which the accumulation of experimental data is ahead of the development of theory, to such an extent in meteorology that Professor Arthur Schuster has said that it would be advisable to suspend all meteorological observations for the next ten years, until the theory should have in some degree caught up with the mass of information already accumulated. The theory of meteorology depends on complicated applications of hydrodynamics and thermodynamics; so as to make great demands upon the mathematical physicist, but the field is a rich one to him possessed of the skill to cultivate it. The study of earthquake phenomena is one that is now becoming of great importance in this country, while the investigation of terrestrial magnetism has lately made great advances.

It is almost obvious to the trained investigator that no one can expect to become a physicist of the first rank without a thorough training in mathematical physics, as without that the results of experiment will never be collected into a coherent system worthy the name of an exact science. Furthermore all mathematical physics must rest upon mechanics, the principles of which are of an importance transcending that of any other branch of natural science. It is for this reason that the courses in physics in this department begin with mechanics, and are developed progressively in a systematic manner. They have the advantage of having been deliberately planned for the needs of students of pure physics, as experience has shown them to be prepared by the various colleges, and of being all delivered by the same person, so that logical consistency and continuity of method are assured. The waste of time often incurred by repetitions of the same subject and of changes of notation by various instructors is thus totally avoided. Attention is called to the fact that no branch of physics is left unprovided for in the course of lectures.

The aim of the department is to insure in its students some acquaintance with all the various fields of experimental physics, to develop in them the power of exact measurement, to accustom them to exact reasoning from experiment to theory, and to encourage original research conducted on a sound basis. To this end students will be put to work in the laboratory upon experiments of sufficient difficulty to give them skill in measurements of precision, and to enable them to become familiar with the precautions and corrections necessary to be employed in exact work. After a sufficient amount of experience has been gained, and the student has shown himself to be possessed of sufficient originality to warrant independent investigation, he will be encouraged to take up for himself an original research in the hope of making a personal contribution to science. In this research he will have at all times the benefit of the direction and advice of the professor.

It should be urged upon intending students to prepare themselves, not only in ordinary laboratory measurements, but also in mathematics, the lack of proper mathematical preparation being a serious drawback to the appreciation of the lectures. In particular may be recommended for study not merely those portions of the calculus which deal with the working out of many indefinite integrals, etc., but the theoretical portions which deal with the ideas of partial derivatives, definite integrals, and their practical manipulation, together with enough analytic geometry to involye the properties of lines and *surfaces* of the second order, and a fair amount of the elements of determinants. As suitable textbooks for preparation may be recommended to the student Lamb's, Osgood's or Gibson's Calculus, C. Smith's Analytical Geometries, and Muir's or Hanus's Determinants. Appell, *Eleménts de l'analyse mathématique* may be very strongly recommended to the intending student for study before and during his course at the University.

It cannot be too strongly urged that the student should, from the beginning, be able to read French and German with ease and to make use of works in them.

REQUIREMENTS FOR THE DOCTOR'S DEGREE

1. The ability to read at sight specimens of scientific French and German, tested before the first of November preceding the doctor's examination by a committee of two members of the Faculty.

2. The successful passing of an examination upon the general subject of Experimental Physics[1] and upon the subjects named above in the regular course in Theoretical Physics, as a major requirement, together with an examination in one minor subject, *to be determined in each particular case by the head of the Physical Department.* This subject will be Mathematics or Chemistry.

3. The presentation of a satisfactory dissertation, involving a substantial amount of original work, and forming a contribution of value to pure science. The presentation of the dissertation is a prequisite to examination. The time of residence necessary for the proper fulfilment of the above requirements will generally be at least three years, of which at least one will be very largely devoted to work on the dissertation. Students will not be encouraged to enter upon the work of a dissertation until they have acquired sufficient experience to enable them to specialize with advantage.

The aim of the department is to produce physicists rather than electricians, acousticians, opticians, engineers, or narrow specialists of any sort, for although in the nature of things one will be obliged to know more of one subject than of others, yet it seems evident that no thorough knowledge of any branch can be gained without a comprehensive view over the whole subject. Without this the specialist, or the experimentalist lacking a knowledge of mathematics, will continually be falling into pitfalls which the more wary avoid. Furthermore it can be but a detriment to science to encourage research in new fields by immature and ill-prepared minds and hands.

The following statement is here inserted for the benefit of students of mathematics.

---

[1] Every student is recommended to provide himself with Winkelmann's *Handbuch der Physik* as a work for continual reference.

The minor in Mathematical Physics consists of the subject-matter of courses 1, 2, 3, and 10, which are intended to constitute the equivalent of five hours a week for one year. Course 10 is given in alternate years to the other courses. The subject-matter of the course is contained in Dr. Webster's treatise on *Dynamics* and Riemann-Weber's *Partielle Differentialgleichungen.*

THE LABORATORY

The laboratory occupies three floors of one wing of a large well lighted building free from disturbances, and admirably adapted to the purposes of a physical laboratory. On the ground floor is a room extending across the end of the building forty-five feet long by twenty-two feet wide, with windows on three sides, above which are three similar rooms. A lift running from the bottom to the top floor affords means of transporting apparatus, while its shaft furnishes space for manometer or barometer tubes. In the lower room are four piers with heavy stone tops, and two others below the floor on which can be placed heavy tables.

Also on the ground floor is a large dark room, partially below ground, in which the temperature is tolerably constant, containing a very large and heavy pier. The engine and storage-battery room contains a kerosene engine and dynamo on the same foundation and sixty storage cells of ten amperes capacity, constituting the power-supply. The engine may be started at a few moments notice, even at night. The storage cells are conveniently arranged so that each one is accessible from each side, from above and below, and the ventilation is excellent, while the room is as light and clean as the work-rooms. Distributing switchboards allow the current from the dynamo or any section of the battery to be supplied to any of the rooms. On the same floor are three rooms constituting the workshop, one of the most important parts of

a research department of physics. The first room is devoted to wood-working and pattern-making, and accommodates also a bench for soldering. The next room contains the machinist's bench, two engine-lathes and planer, and the third room a Rivet precision bench-lathe, jeweller's lathe and drill-press. There is no countershafting in the building, each tool being driven by a separate electric motor, while the capacity of the battery is such that for ordinary purposes it is not necessary to drive the engine for the shop alone, so that perfect quiet and steadiness are ensured. In the shop are executed all repairs and alterations of apparatus, and the new apparatus requiring continual experiment is constructed. Most of the principal pieces of apparatus belonging to this department have been thus constructed. In this manner, by having a mechanic always present, an extremely great economy in time and money is effected, and vexatious delays, which would otherwise completely arrest the progress of the work, are avoided. Facilities and encouragement are given to the students to construct apparatus for themselves.

On the main floor are the lecture room, the director's office, the large room used as the director's private laboratory and apparatus room, and three other convenient rooms for research. Two of these are arranged so that they may be darkened for photography, and are also fitted with chemical hoods. The large room on the top floor is devoted to the Rowland twenty-foot diffraction grating, and has a photographic dark room attached. There has been constructed during the past year a storage battery of two thousand small cells for researches requiring a constant source of high potential. This battery is conveniently housed next to the grating room. Every room in the laboratory contains sinks, gas and electric light connections, and several circuits connecting with the switchboard in the battery-room.

The laboratory is will equipped with apparatus for research, besides having the facilities above described for the construction of instruments of any sort needed for that purpose. In addition may be mentioned a large collection of diagrams illustrative of mathematical physics, many of them being originals of the figures in Professor Webster's "Electricity and Magnetism" and "Dynamics," and a number of interesting models used in teaching dynamics, thermodynamics, and electricity. Among them are Maxwell's Dynamical Top and a number of other interesting tops, Maxwell's and Rayleigh's induction models, Gibbs's, van der Waals's and other thermodynamical surfaces. This collection of drawings and models can probably not be matched in this country, and is continually being increased.

The laboratory affords so much space that it is rarely necessary to put more than one student in a single room. Every student receives personal attention in the laboratory from the professor whenever he needs it, and is continually in receipt of instruction and suggestion by personal contact, the best form in which information can be imparted. Emphasis should be laid on the advantage to the research student of the contact with a professor who has no other duties or interests than the furtherance of research, in an institution devoted to this as its main object.

THE LIBRARY

In the library Clark University has one of its strongest features. With a large separate building, administered in the most liberal manner with a view to the advantage of the research student, and with ample funds for the purchase of books, its facilities in the Department of Physics can hardly be surpassed. It may be said to contain all of the most important works in many languages, and is continually kept

up to date, any book wanted needing only to be mentioned to be procured. The library is particularly rich in journals, among which are included the transactions of the learned societies of England, France, Germany, Italy, Austria, Holland, and Belgium. Other sets are being continually added. There are few subjects connected with physics which may not be thoroughly studied in this library.

The following works may be mentioned.

Collected Writings of Helmholtz, Hertz, Clausius, Kirchhoff, Kelvin, Lorentz, Gibbs, Green, Huggins, Hopkinson, McCullagh, Joule, Stokes, Maxwell, Rankine, Rayleigh, Regnault, Reynolds, Rowland, Rumford, Tait, Young, Gauss, Fourier, Laplace, Arago, Cauchy, Foucault, Fresnel.

Potential, Electricity and Magnetism. Riemann, Betti, Dirichlet, Korn, Mathieu, Somoff, Kirchhoff, Neumann, Minchin, Routh, Clausius, Duhem, Maxwell, Boltzmann, Drude, Lorentz, Mascart and Joubert, Wallentin, Watson and Burbury, Webster, Gray, Heaviside, Thomson, Poincaré.

Elasticity. Mathieu, Ibbetson, Love, Todhunter and Pearson, Williamson, Clebsch, Neumann, Lamé, Boussinesq, Résal, Poincaré.

Hydrodynamics. Bassett, Lamb, Kirchhoff, Neumann, Poincaré, Wien.

Light. Mascart, Kirchhoff, Helmholtz, Neumann, Volkmann, Drude, Résal, Poincaré, Bassett, Curry, Preston, Wood, Maclaurin, Schuster, Walker.

Heat. Clausius, Helmholtz, Kirchhoff, Planck, Rühlmann, Boltzmann, Voight, Zeuner, Bertrand, Duhem, Poincaré, Preston, Weinstein.

Sound. Rayleigh, Donkin, Barton.

A large number of treatises on mechanics, a set of the Travaux et Mémoires du Comité International de Poids et Mesures, and of the published memoirs of the Physikalisch-technische Reichsanstalt, may also be mentioned.

Among the journals are complete sets of the

Annalen der Physik und Chemie.
Annales de Chimie et de Physique.
Bulletin of the Bureau of Standards.
Comptes Rendus.
Eclairage Electrique.

Journal of Physical Chemistry.
Nature.
Philosophical Magazine.
Philosophical Transactions.
Physical Review.
Physikalische Zeitschrift.
Proceedings of the Royal Society.
Science.
Science Abstracts.
Zeitschrift für Instrumentenkunde.

The library subscribes to the following journals also:

American Journal of Science.
Annalen der Physik.
Beiblätter zu den Annalen der Physik.
Electrical World.
Electrician.
Elektrotechnische Zeitschrift.
Fortschritte der Physik.
Jahrbuch der drahtlosen Telegraphie und Telephonie.
Jahrbuch für Elektronik.
Journal de Physique.
Le Radium.
Il Nuovo Cimento.

III CHEMISTRY

The aim of the Department is to equip students for original work in chemistry. Such equipment, consisting in a clear knowledge of the principles and methods of the science, is believed to be best for the industrial chemist as well as for the collegiate teacher. The teacher of chemistry who is unable to contribute a share to the growth of his science will teach the dead letter of some text-book and can hardly impart to his students a practical knowledge of natural phenomena. And in the opinion of leaders of the great chemical industries in Europe, a young industrial chemist, too, is best equipped, not if he has acquired (necessarily unpractical) information in the chemistry of the manufactures, but if he has obtained clear critical knowledge of the principles of pure chemical science and some experience in grappling with difficulties. The desire for *such* knowledge, and the courage and perseverance necessary in attacking problems, are acquired only through research.

The work of the Department will be conducted with these principles in view and will be adjusted to the needs of the students from year to year. Advanced students will be expected to spend most of their time on research work. However, specialized courses on topics of history of chemistry, chemical dynamics, heterogeneous equilibria, organic synthesis, stereo-chemistry, electro- and thermo-chemistry, applications of thermodynamics to chemistry, etc., will be offered, and the students will be expected to attend them regularly. Each topic will be approached, not as a chapter in a book but as a problem in nature. It will be introduced by an estimate of its importance and of its bearing on other prob-

lems. Then an account will be given, on the historical plan as far as possible, of the extent to which the problem has been solved, of how this was done, and of how much is not yet solved, with suggestions as to practical methods by which solution might be obtained. It is believed that such *critical mode* of study, much more than the "advanced" nature of the subjects studied, is the true characteristic of university work.

To aid students not quite prepared for work of this kind, lecture and laboratory courses will be offered in general inorganic and organic chemistry, organic synthesis and analysis, physical chemistry, etc. The time required for such students to qualify for the degree of Doctor of Philosophy will depend in each case upon the proficiency of the student. Residence for one year is required, and three years will not be too long for most graduates. A working knowledge of analytical geometry and the calculus will be pre-supposed in all the work of the Department.

The research work conducted in the Department will be mainly along the following lines: 1. Experimental and theoretical study of the deviations of fact from the accepted principles of general chemistry; 2. Experimental study of organic substances and reactions from the standpoint of chemical statics and dynamics.

Of course, promising investigations may be taken up, from time to time, along other lines as well.

Instead of more or less insignificant pieces of work being "assigned" to students for their first experience in research, they will be made, as early as possible, the *collaborators* of their professor in his own investigations (unless, indeed, they bring forward practicable research projects of their own). Nothing could more certainly assure constant and intimate contact between professor and student and the student's really receiving the best that the Department can offer: individual guidance.

REQUIREMENTS FOR THE DOCTOR'S DEGREE

1. A good reading knowledge of both German and French, which the student ought to acquire as early as possible.

2. A working knowledge of analytical geometry and the calculus.

3. The passing of an examination in the several branches of chemistry, including modern physical chemistry, chemical statics and chemical dynamics, and in one minor subject, to be determined in each case by the head of the Chemical Department.

4. Above all, the presentation of a dissertation which in the opinion of the head of the Department will form a *genuine contribution*, either purely theoretical or experimental, to chemical science.

COURSES

The lecture work this year is in a sense a continuation of last year's, and therefore a statement of both years' courses may not be devoid of interest.

The academic year 1908–09 was devoted mainly to studies in organic chemistry, by way of preparing a concrete basis for the present year's work in general and physical chemistry. *This year the students have been advised to devote about one-quarter to one-third of their time to all scholastic work combined, and at least two-thirds of their time to original research.* The scholastic work is mainly in general and physical chemistry, supplemented by an extensive course in thermodynamics given by Professor Webster in the Department of Physics. Parallel with these run briefer courses on select chapters of modern organic and inorganic chemistry, with a small amount of laboratory work. Finally, in the Colloquium both students and instructors lecture on select topics of chemical research.

A. *Professor Rosanoff's Courses*

1. Organic Synthesis (laboratory course, given in 1908–'09, with a few additional preparations to be carried out this year). Gattermann's *Praxis* is followed, with frequent deviations, however, calculated to pre-

vent the student from following directions like cook-book receipts, and to compel him to use his own inventive power.

2. Organic Stereo-Chemistry (given in 1908–'09). This subject was chosen because presenting an opportunity for a thorough study of the carbohydrates, of the structure of benzene, of ethylene derivatives, etc.

3. The Hydro–Aromatic Series, including the monocyclic and polycyclic terpene bodies (given during the year 1908–'09, to be followed by a course on open chain terpenes in 1910–'11). This difficult chapter of recent organic chemistry was chosen, not only because a clear knowledge of it is becoming essential in the equipment of the best chemists, but also because it offers excellent opportunities for readings in the periodical literature of the last fifteen years.

4. General and Physical Chemistry, Tuesdays at 11 and Thursdays at 9 a.m. This course is given during the current year and will be followed by a special course on the thermodynamic method, its use and results in chemistry, in 1910–'11. The main chapters of this year's course are as follows: (*a*) An almost exhaustive consideration of the laws of the gaseous state of aggregation and of the kinetic theory attempts of correlating the extant experimental data. A critical examination of the theory of corresponding states is naturally included in this chapter; (*b*) The known empirical relations between the physical properties of liquids (and solids) and their chemical composition and constitution, with detailed accounts of the experimental methods involved in determining those properties; (*c*) The theory of solutions, including a critical examination of the anomaly of strong electrolytes; (*d*) The general principles, methods, and results of chemical statics and kinetics; (*e*) The fundamental principles of thermo- and electro-chemistry; (*f*) The Phase Rule, and a general introductory study of heterogeneous equilibria. The subject matter of the course is presented as a series of problems, partly solved, partly awaiting solution, and almost throughout calling for more experimental and mathematical investigation.

5. Colloquium, *directed jointly by the members of the departmental staff*. This is held once in two weeks, from 8 to 10 p. m., in the University Chemical Lecture-room. The students are expected to report on such classical topics as the discovery of oxygen and the overthrow of the phlogiston theory, Pasteur's discovery of the stereo-isomeric tartaric acids, etc.; or on recent contributions, such as typical Grignard syntheses, the reduction work of Sabatier and Senderens, the pyrogenetic researches of Ipatieff, new asymmetric syntheses, current contributions concerning the Walden inversion, recent work on the synthesis of alkaloids and of

polypeptides, current studies of the kinetics and catalysis of organic reactions, etc. An important part of this year's colloquium work will consist in lectures by the students on the results of their own investigations.

B. *Dr. Merigold's Courses*

6. Advanced Quantitative Analysis and Inorganic Preparations, given in 1908–'09. This course is intended to give a more comprehensive view of the subject of quantitative analysis than is obtained from elementary courses. Lectures treat systematically the determination of all the common bases and acids, with critical comparison of various methods. By discussion of the best methods introduced as a result of recent research, as well as of the best of the older methods, an attempt is made to make this feature of especial value. Attention is given to applications of modern theories, and some of the more complex methods of analysis are studied in the laboratory.

As a part of the laboratory work there is also given practice in the preparation of pure inorganic compounds. The methods used are not merely those commonly found in the text-books, but are based upon the most careful work to be found in the recent literature of inorganic research.

7. Advanced Inorganic Chemistry (given this year). A critical study of special topics of inorganic chemistry. This course is intended to furnish both theoretical and practical knowledge of some of the more important problems of inorganic chemistry. Special attention is given to the results of recent research upon such topics as the structure of atoms, valence and chemical affinity, stereo-chemistry of inorganic compounds, and *the principles and methods of atomic weight determinations*. A critical comparative study is made of the work of recent investigators in these subjects, and the bearing of this work upon present theories considered. Particular attention is given also to the practical methods of exact work used in the most successful researches in this field.

C. *Dr. Clark's Course*

8. Select Topics of Organic Chemistry (given this year), Fridays at 11 a.m. This course is intended to outline the recent advances made in some of the most important branches of present organic research, such as: the synthesis of alkaloids, Fischer's work on the proteins, a systematic study of the dyestuffs, including modern physical methods for determining the configuration of complex compounds, with special references to Baly's work on spectroscopy of organic compounds.

D. *Special Courses*

9. Dr. Hubbard, Head of the Collegiate Department of Physics, is this year giving a course of lectures to the students of chemistry, interpreting and discussing the principles of thermodynamics as given in the mathematical course mentioned above.

10. In 1908–'09, Professor Story lectured in the University Chemical Lecture-room, on Mathematics for Students of Chemistry. The aim of the course was to help the students acquire that mathematical knowledge without which the professional education of a chemist, whether engaged in teaching or in industrial work, is today no longer complete.

E *Professor Noyes's Lectures*

11. The Department has been fortunate enough to secure the appointment of Professor Arthur A. Noyes, of the Massachusetts Institute of Technology, as Non-resident University Lecturer on Chemical Research for the year 1910-'11. The topics of Professor Noyes's lectures will be announced later.

FACILITIES

The University chemical laboratories occupy a considerable part of the laboratory building. The storerooms contain an unusually large collection of organic preparations, besides all the ordinary inorganic chemicals. The collection of physico-chemical apparatus including the latest form of Pulfrich's refractometer, an excellent Schmidt and Haensch polariscope, a fine spectroscope, a Burkhardt calculating machine, an Altschul apparatus for measuring critical pressures, specially constructed large constant-temperature stillheads, a set of excellent thermostats, sets of fine thermometers, etc., is sufficient for most ordinary purposes. Whatever special apparatus and chemicals are needed in connection with the work of research are ordered at once, every reasonable effort being made to help the student obtain a maximum of results with a minimum expenditure of time and energy. In this connection it may be mentioned that the Department is at liberty to use the services of the skilled mechanician regularly employed by the Department of Physics. Students will themselves prepare their chemicals, or build their research apparatus only in those cases in which the Director may consider such work especially instructive to them.

It is believed that the facilities for serious research offered by the Department are in many ways exceptional.

SCHOLARSHIPS AND FELLOWSHIPS

The Department has at its disposal several Scholarships and Fellowships, which will be awarded each year to the ablest and best recommended applicants. Scholars, and especially Fellows, will coöperate with the Director in maintaining a harmonious and scientific atmosphere in the Department and in promoting all the ends of the University. They will have no duties besides that of making the best use of the facilities for study and research offered to them.

IV BIOLOGY

Programme for 1910-1911

Dr. Hodge will offer the following courses:

1. Dynamic Biology and General Physiology. It is proposed to combine in this course the fundamental laws and principles of biological science, the emphasis being placed on the functional or dynamic side rather than on the side of morphological structure. In other words, the point of view of the course is that living species have assumed certain forms and have developed definite structures in order to fit them to perform a certain work in the economy of nature. The first half-year is devoted to the study of a typical series of animals as forces in nature, special attention being directed to methods and apparatus by which dynamics of species may be investigated. On the side of biological theory, which occupies the last half of the year, among others the following topics will serve to outline the scope of the course. Origin and constitution of living matter. Physiological functions. Classifications of plants and animals. Biological reactions, tropisms, experimental morphology. Differentiation of organs. Growth and reproduction. Heredity. Variation. Specialization. Evolution. Two lectures weekly, October to June. Laboratory work will be arranged to meet the needs of individual students.

2. Biological Instruction. The University stratum—history, aims and methods of biological research. The College level—outlines of college courses and history of their development. Biology in the high school. Biological nature study for the elementary schools. Twelve lectures during October and November.

3. Data of Evolution. Dr. Newton Miller will offer a course of twelve lectures giving the concrete evidences from Comparative Anatomy, Embryology, Paleontology and Geographical Distribution in support of a phyletic sequence in the development of animal types. The course will be fully illustrated with charts and specimens.

A biological seminary will be held one evening weekly, throughout the year. In general the work of this seminary is planned to run on a three-

year cycle as follows: first year, history of science and of biological research; second year, philosophy and historical development of evolution; third year, the laws of heredity and variation. The year 1910-1911 will be the second year of the cycle.

Neurology

It is intended to arrange the course in such a manner that the general field may be covered in two years. This will leave the student free to devote his entire time during the third year to special study in the literature of the science and to the prosecution and completion of his thesis work. Accordingly, a two-year cycle will be arranged as follows:

4. Comparative Study of Nervous Systems and Sense Organs. This course will form the natural basis for comparative psychology and together with the working out of a minor problem may well constitute a minor for one whose major is psychology or philosophy. On the biological side it will be closely correlated with general physiology and morphology. It is intended to begin with a comparative study of the structural elements of the nervous system of both invertebrates and vertebrates and then correlate and compare the different degrees of complexity of function with the anatomical organization found in the ascending series. The course will be illustrated throughout by diagrams, models, dissections and microscopical preparations and experiments. Laboratory work one afternoon weekly, or arranged to meet the needs of individual students. One hour weekly for general class exercise, or its equivalent.

5. The Human Nervous System and Sense Organs. This course will deal with the anatomy, both gross and microscopic, and with the physiology and hygiene—fatigue and sleep, growth and development, brain localization. One hour weekly, or the equivalent. Laboratory one afternoon a week, or arranged to meet the needs of individual students.[1]

By way of supplementing the above and courses in other departments of the University, three special courses have been planned as follows:

[1]For elementary courses in special physiology, histology and hygiene refer to announcement of biological courses in the Collegiate Department.

6. Practical Histology. The course will be a laboratory course, with such lectures, directions and conferences as may be required by those taking it. It will be arranged practically to meet the needs of individual students. Considerable latitude will be given, so that any who wish may make it a comparative study by way of supplementing courses 1, 3, 4 or 5, prepare a series of demonstrational specimens for themselves, or devote their time to special problems.

7. For those who do not take work in the laboratory, but desire to see the actual specimens and experiments, a course of demonstrations to run somewhat parallel with the above courses will be offered. One hour weekly, through the year.

8. Special Biological Lectures. In this course all members of the Department are given an opportunity to present in lecture form topics—reviews of books and important investigations and particularly results of their own researches. About one lecture weekly throughout the year.

Experimental Work

Laboratory work in biology, physiology, histology, and neurology is arranged to meet the needs of individual students. Its general purpose is to facilitate practical familiarity with methods of research, and as soon as practicable each student is expected to begin an original investigation. Standard apparatus of most approved types is at the disposal of the laboratory, and when new work requires specially devised apparatus, every effort within the means of the department is made to obtain it. The aim of the laboratory is thus to place at the disposal of those interested in the solution of physiological and neurological problems the best obtainable facilities for the prosecution of their work. In case one has not decided on a special line of research, the resources of the department are such that he will be given a fairly wide range of problems from which he may select a subject suited to his tastes and attainments. A course in biology such as is given in our best colleges and State universities is sufficient to enable students to begin work here.

A long-felt need of the department is now supplied in the possession of land well adapted and conveniently located for biological research. Ideal facilities can now be offered for the study of daily rhythms, lives and work of species under natural conditions; and also for experiments in animal and plant breeding. It is proposed to organize an extended series of researches upon the effects of different chemical substances and conditions of life upon the viability and vigor of the germ plasm.

While no regular laboratory fees are charged, each student is expected to refund to the laboratory the cost price of all the more expensive reagents, including alcohol, ether, chloroform, formalin, celloidin, and the like. Each student must supply his own microscopical glass, slides and covers, and must pay the cost price of all glassware that he breaks. All students are expected to take the best possible care of all apparatus entrusted to their charge, and to return it to the laboratory clean and in good order.

The library of the department has been selected with two important considerations in view. The first of these is to obtain the standard classics in the science. The second is to keep abreast of the times by having the best recent literature readily accessible both for study and reference. This latter class of selections thus includes monographs and text-books and current numbers of journals, with complete files of many of the more important. A complete set of indexes, Jahresberichte and Centralblätter greatly facilitates the work of referring to the literature of topics under investigation in the laboratory.

The Journal Club meets weekly, for the purpose of reporting and discussing important articles in the current periodicals.

A complete list of the Journals will be found in the *Publications* of the Library.

V ANTHROPOLOGY

DR. CHAMBERLAIN will lecture twice a week throughout the year. The courses offered endeavor to cover the following field:

GENERAL ANTHROPOLOGY, embracing: (a) History; scope and relations of the science. (b) PHYSICAL ANTHROPOLOGY; problems, investigations, results, laboratory work. (c) ETHNOGRAPHY; races and race-origins. (d) ETHNOLOGY, INCLUDING SOCIOLOGY; origins and development of the arts and sciences, institutions, ideas and ideals of man and the races of man, human civilizations, their origin and development. (e) MYTHOLOGY; folk-lore, religions. (f) LINGUISTICS; race and language, origin and development of language and of languages, psychology of language, gesture-speech and written language, comparative linguistics, comparative literature. (g) CRIMINAL AND PATHOLOGICAL ANTHROPOLOGY; physical and mental, ethnic morals. (h) HISTORICAL AND ARCHAEOLOGICAL; primitive man and primitive culture, the precursors of man.

SPECIAL ANTHROPOLOGICAL TOPICS most akin to Psychology and Pedagogy, embodying the results of the most recent and important studies and investigations of the following and other subjects, particularly, The Characteristics of the Primitive Races and their Rôle in Human History; The Physical Anthropology of Infancy, Childhood, Youth, Manhood, Old Age; the Anthropological Phenomena of Growth, Arrested Development, Degeneration; Anthropological Aspects of Heredity and Environment in the Individual and in the Race; Uncivilized Races and Civilized Races; the Phenomena of Race-Mixture; the Evolution Problems of Humanity; Education among Primitive Peoples; the Anthropological History of America; the Interpretation of Folk-Lore; the Psychology of Primitive Peoples; the Trend of Human Progress; the Psychology of Primitive Languages; the Mind of Primitive Man and its Expressions; the Development of Human Personality; the Rôle of the Individual in Primitive Culture; Progress and its Criteria; the Orient and the Occident in their Relations to Human Evolution; the Negro in Africa and in America; the American Indian; the Anthropology of Japan and China; "World Languages" and "World Culture."

The lectures in Anthropology will have special bearing upon the courses in Psychology and Pedagogy in the University, and every effort will be made to utilize the latest results of Anthropological investigations.

From time to time, the most valuable current literature will be reviewed and students made acquainted with the best contributions to Anthropological Science in the various foreign languages. The importance of a thorough acquaintance with the bibliography of their subjects is impressed upon all students, and all possible assistance in this direction is always at their disposal.

VI PSYCHOLOGY

A complete course in Psychology at Clark University includes the following subjects:

1. Anatomy and Physiology of the Brain and Spinal Cord, sense organs, and other parts of the body, especially the muscles, the organs of the will, so far as they affect psychological powers and processes, with a good general background of biology. For this a special laboratory is equipped. See Dr. Hodge's announcement.

2. Physiological and Experimental Psychology, including an outline of the anatomy and physiology of the central nervous system and sense organs; the elementary sense experiences; sensation and perception; the measurement of sensational intensity; space; time; reaction times; feelings and emotions; memory; association; attention; apperception; will; fatigue and rest; sleep; hypnotism; temperament; character; interdependencies of mind and body. For this a special laboratory is equipped. See Dr. Sanford's announcements.

3. Comparative and Genetic Psychology. Review of the general doctrine of evolution as a basis for the evolution of mind. Review of experimental and observational studies upon typical forms of animal life beginning with the protozoa. Instincts; animal and human infancy. Childhood and adolescence. See announcement of Drs. Hall, Baird and Porter.

4. Abnormal and Morbid Psychology, as nature's experiments, *e. g.*, border-line phenomena as seen in neurotic people, prodigies, and geniuses; defectives, such as the blind, deaf, criminal, idiotic; mental and nervous diseases, epilepsy, phobias, neurasthenia, hysteria; morbid modifications of will, personality and emotion, etc. Special clinical facilities for this work are open to the department in the hospitals and other institutions of the city. See Dr. Hall's lectures and Dr. Cowles, lectures and clinic.

5. Anthropological Psychology; myths, customs and belief, comparative religion and psychology of religion, primitive art, and the study of the life of savages and children; adolescence and senescence; physic

measurements illustrating laws of growth in size and power, etc., See Dr. Chamberlain's courses.

6. Æsthetics and Ethics, the psychology of music, painting, literature, the phenomena and laws of volition and morality.

7. History of Psychology and Philosophy, including the chief culture institutions, science, medical theories, Christianity, and education generally. Dr. Hall's historical courses and seminary.

8. Applications of Psychology, Pedagogy, including mental and moral hygiene and regimen, school organization and methods from kindergarten to university; the sex problem; defectives, etc. Dr. Hall's and Dr. Burnham's courses.

9. The Psychology of Sex; lessons from the aberrations of this instinct; some of its normal phenomena; the current theories; psychic differences between men and women; education of girls; fatherhood, motherhood; instruction of the young in matters pertaining to sex; theories of Freud, Moll, Ellis, etc.

10. The Psychology of Border-line Phenomena, including spiritism, telepathy, hypnotism, dreams, multiple personality, somnambulism, crystal gazing, dousing, mind reading, sleight of hand performances, major symptoms of hysteria, psychotherapeutics and mind cure, methods of psychological analysis, etc.

The aim of the Psychological department is to cover this field as well as its instructors are able to do so in two or three years.

The Psychological Laboratory consists of a suite of eleven rooms on the third floor of the main building, devoted to the following purposes: 1, Departmental Library; 2, Lecture Room; 4, Office of Director; 5, Apparatus and preliminary setting up of apparatus; 3, 6, 7, and 8, Rooms for demonstration and research; 9, Quiet room for sound experiments; 10, Photographic Dark Room; 11, Shop. In space and favorable situation the Laboratory leaves little to be desired.

It is also well supplied with apparatus for both demonstration and research, and has access besides to the collections of the physical and biological departments, and that of the psy-

chological department of the College. Many pieces have been manufactured at the university and a considerable number have been designed here for particular researches. The collection is constantly increasing by purchase or construction, especially in apparatus for research.

Provision for Comparative Psychology is now made at the Hadwen Arboretum, about fifteen minutes walk from the main building of the University, where special facilities for the care of the animals have been provided.

The Psychological section of the General Library is full on Experimental and Physiological Psychology, and upon The Psychology of Religion and the Study of Children. All the more important journals upon Psychology and related topics in English, French, German and Italian are received regularly at the University and complete sets of these and of the proceedings of learned societies are upon the shelves of the library.

The following courses are announced for the academic year 1909–1910.

DR. HALL'S COURSES

Dr. Hall will probably give the following courses next year, although variations from this programme may be made if there is reason to believe that the greatest good of the greatest number of students will be thereby promoted:

1. The History of Modern Philosophy.
2. The Psychology of Religion and of Christianity.
3. The Psychology of Childhood from Infancy to Adolescence, supplementing Dr. Hall's volumes on the psychology of adolesence.
4. The Psychology of Sex.
5. Abnormal and Border-line Psychology, with special reference to the Freud school.
6. Present Themes in Education

7. The Seminary, at Dr. Hall's house three hours every Monday evening through the year.

8. Researches with individuals on special topics.

DR. BAIRD'S COURSES

1. General Psychology. This course will present, in brief form, an outline of modern views of psychology. The facts and theories of sensation, affection, perception, memory and imagination will be presented and discussed. This course is intended chiefly to meet the needs of students who elect psychology as a minor subject for the Master's degree. One hour a week throughout the year.

2. Experimental Psychology. An introductory laboratory course designed to familiarize students with the use of psychological apparatus and of psychological methods. The experimental work will be supplemented by lectures and informal discussions of results. This course aims to prepare the student for independent research in experimental psychology. Four to six hours a week throughout the year.

3. Advanced Psychology. The more Complex Mental Processes. Lectures and demonstrations arranged to present in detailed and systematic form the more important results which have been yielding from the experimental investigation of the emotions, the learning process, judgment, and the meaning consciousness. Portions of Wundt's *Grundzüge der physiologischen Psychologie* will be assigned as collateral reading together with other references from the literature. Two hours a week throughout the year.

4. Psychological Journal Club. Reports and discussions of current monographs and periodicals. One session a week throughout the year.

5. Research. The investigation of problems by properly qualified students. Throughout the year, at times to be arranged.

DR. PORTER'S COURSES

Dr. Porter, Instructor in Comparative Psychology, will give a limited number of lectures upon the study of animal instinct, especially under controlled conditions.

At the Hadwen Arboretum where a "station for the study

of animal behavior" has been established and is now under Dr. Porter's direction, are found facilities for the study of certain forms of animal life; and here too will be found some of the illustrative material for his lectures.

Psychiatry

Dr. Cowles, lecturer on Psychiatry, former head of the McLean Hospital at Waverley, Mass., will give a course at the University and clinical demonstrations at the Worcester Insane Hospital. Dr. Cowles's course includes the following topics:

1-2. The Dependence of Psychiatry upon Mental and General Physiology, the concept of energy fundamental; the reflex arc and integrative action of the nervous system. Relation of inhibition to anabolism, to external function and katabolism.

3. The Physiology and Pathology of Emotion; depression and exaltation figurative expressions in psychology, both being excitations and katabolic; relations of feeling-tone to conditions of ill-being.

4. Psychasthenia and Neurasthenia; the minor psychoneuroses—psychological automatism, fixed ideas, hysteria.

5. Mental Systems on Nervous Exhaustion; their genesis in reductions of functional capacity of the nervous and mental mechanism.

6, 7, 8. The melancholia-mania group of neuropsychoses (not tending to dementia).

Dr. Cowles's lectures are open without fee:

(1) To all members of the Faculty of the University and College;

(2) To all members of the Psychological Department, and to members of the College who are taking other psychological courses in the University.

The fee for all other persons is $10.00.

VII PEDAGOGY

This department offers a course which can be taken as a minor for the degree of Doctor of Philosophy. Its work is in the closest connection with that of psychology and anthropology, and in part based on these subjects. The work in this department is intended to meet the needs of the following classes of students.

First. Those intending to teach some other specialty but who wish a general survey of the history, present state methods, and recent advances in the field of university, professional and technical education.

Second. Those who desire to become professors of pedagogy, or heads or instructors in normal schools, superintendents, or otherwise to become experts in the work of education.

The programme of the Pedagogical Department includes courses upon the following subjects:

1. (*a*) Child Study, (*b*) Pedagogical Psychology. (*c*) Experimental Pedagogy. (*d*) School Hygiene.

2. (*a*) Principles of Education. (*d*) History of Education and Reforms. (*c*) Methods. Devices, Apparatus, etc.

3. (*a*) Organizations of Schools in Different Countries. (*b*) Problems of College Education. (*c*) The Teaching Profession. (*d*) Motor Education, including manual training, physical education, etc. (*e*) Moral and Religious Education. (*f*) Ideals.

The courses in pedagogy for 1910–1911 will be as follows:

DR. WILLIAM H. BURNHAM'S COURSES

A. The Hygiene of Instruction. Mental hygiene and the hygiene of instruction. The laws of nervous activity in relation to problems of

instruction. Fatigue. The period of study. The hygiene of the kindergarten. The hygiene of spelling, reading, writing, arithmetic, manual training, physical training, etc. The hygienic aspects of grading, of examinations, of discipline, of punishment, etc. *One hour a week throughout the year.*

B. Principles of Education. This course treats certain fundamental educational principles and involves also a study of several important chapters in the history of education, with a brief account of a few representative educational systems. Such topics as the following will be included: Educational ideals. The dominant aim at different stages of development. The correlation of educational forces. The family and education. The church and education. State aid and control. The field of scientific study in education. Antithetic educational principles. The history of nature versus convention in education. Rousseau. Pestalozzi as "pedagogical socialist." Modern Sozial-Paedagogik. Present problems and tendencies. *One hour a week, half a year.*

C. Recent Movements and Present Problems in Education and School Hygiene. This course will involve the discussion of special topics and problems of pedagogy, school hygiene, child study, and educational psychology. Topics like the following will be considered from the point of view of genetic psychology and of hygiene:—Correlation. Enrichment of the course of study. Grading. Doctrines of interest. Training of the will. Problems of organization and administration. Recent educational literature. *One hour a week, half a year.*

D. Seminary. The work will be determined in part by the needs of the students who elect this course. It will probably be devoted chiefly to some phase of the history of education or to the literature of experimental pedagogy. It is hoped, also, that each student will select, after consultation with President Hall and Dr. Burnham, a topic for special investigation. The results of such studies may be published. *One or two hours a week, throughout the year.*

President G. Stanley Hall's Course

Vital present topics in education. See special circular later.

Dr. Edmund C. Sanford's Course

The Problems of College Education. A discussion of the most important questions of college efficiency with

especial reference to present day tendencies and criticisms. *One hour a week throughout the year.*

The courses as announced above may be modified somewhat as the needs of the students or other circumstances may require.

The library of the department has a large collection of Educational Literature, being especially rich in German and French literature, and having a large number of official reports from vatious countries—English, French, German, Belgian, Swedish, etc.; also town and city reports, and reports of special institutions; and a collection of French, German, and American text-books.

The books are arranged under the following heads:

1. General.
2. History of Education.
3. Educational Systems.
4. The Theory of Education and Special School Subjects.
5. Educational Psychology.
6. Child Study.
7. School Hygiene and Physical Education.
8. Text-Books.
9. Miscellaneous.

Many of the more common educational books are accessible in the Worcester Public Library and have not been duplicated by the University. The large collection of educational text-books in the library of the American Antiquarium Society and its valuable historical material are also accessible to the University.

The collection of educational periodicals includes a large number of the best foreign journals—English, French, German, Swedish, etc.

The nucleus of an educational museum has been formed,

which contains a valuable collection of EDUCATIONAL APPARATUS, pictures and other material for language lessons and *Anschauungsunterricht* maps, charts, diagrams, models illustrative material in school hygiene, etc.

The *Pedagogical Seminary* is a journal issued at the University, and serves as a convenient medium of publication for special investigations undertaken in the department.

SPECIAL STUDENTS IN EDUCATION

In addition to the members of the University, special students are admitted during the year to the Saturday courses of Drs. Hall and Burnham in Education, for a fee of $20.

VIII ECONOMICS AND SOCIOLOGY

The courses here outlined indicate the scope of the work offered. Effort will be made to accomodate the courses given in any year to the interests and requirements of students.

1. Recent Economic Theory. This course is devoted in the main to the writings of Jevons and Marshall, Clark and Böhm-Bawerk, as presenting leading types of modern economic theory. Some attention is also given to the relation between the present trend in economic thought and present economic conditions.

2. Economic Topics, chosen from such subjects as trusts, the tariff, problems of transportation, and industrial democracy.

3. History of Social Theories. In this course are considered in brief outline the social theories of Plato and Aristotle, of later Greece, of early Christianity, of Rome, and of the Middle Ages, emphasis being laid upon the connection between the theory studied and the existing economic and social conditions. The writings of more recent sociologists are studied as representing the development of certain principles of sociological interpretation.

4. Social Topics, selected from immigration, emigration, fecundity of population, eugenics, pauperism, marriage and divorce, suicide, crime, etc.

5. Socialistic and Communistic Theories of the Last Century, including an historical survey of communistic societies in Europe and America and a critical examination of socialist doctrines. This course studies not only so-called scientific socialism and the theories of distribution presented thereby, but views socialism also from the standpoint of social and industrial evolution and social reform. The practical difficulties of the socialistic state are also considered

During the year 1909–10 the following two courses were given:

6. History of Industrial Evolution. Includes a study of the rise and decline of the guild system; the development of the factory sys-

tem, with the attendant demarcation of social classes; use of machinery, etc.; the labor movement; the growth of trusts; and other features of present industrial tendency.

7. Economic and Social Statistics. Devoted largely to the various phenomena of population, births, deaths, marriages, divorces, etc., but including also a statistical study of wages and prices.

IX HISTORY

Dr. BLAKESLEE will offer the following courses:

1. CONTEMPORARY HISTORY. Students who wish to do graduate work in history will be expected to possess a sufficiently broad knowledge of the general field so that they may be able, with intelligent appreciation, to take up the study of special topics. The subjects to which the department will give particular attention are those which have a real importance at the present day. The students may gain the necessary information from the lectures and from extended reading; the preparation of papers, reports, and theses will give the training which will enable them to take up any new historical subject which may challenge public attention, present its important features clearly and accurately, and show its relations to the events and the great world movements of the past.

The subjects recently studied have been Russia,—political, social and constitutional development, with emphasis upon the causes and the events of the revolutionary movement; the Congo Free State, particularly a critical study of the evidence relating to King Leopold's misgovernment; the history of the American Negro and the present Negro problem; the Government of Dependencies, including such topics as Race Psychology and the problems of the social, economic, and religious education of primitive peoples; and the present situation in the Far East, especially Manchuria, Korea, Japan, China, the Philippines and Hawaii.

Each year one of the following courses also will probably be given:

2. INTERNATIONAL LAW. The aim of this course will be to give a knowledge of the general principles of International Law. So far as possible definite cases will be studied, and for that purpose Scott's "Cases on International Law" will be followed. Especial attention will be paid to the legal questions involved in the Russian-Japanese controversy; to the history and present status of arbitration; and to the changes in International Law brought about by such recent congresses as those

held at the Hague. The study of leading authorities and cases will be supplemented by lectures, discussions and thesis work.

3. English History—the Period of the Tudors and the Stuarts. This course will extend from the accession of Henry VII, in 1485, to the death of Queen Anne, in 1714, and will deal especially with the establishment of practical absolutism under Henry VII and Henry VIII; the rise of Protestantism; the development of Puritanism in State and Church; the great Civil War; Cromwell and the Puritan Ascendency; the attempts to form a firm constitutional government; the relation of English Puritanism to that of Switzerland and New England; the restoration of monarchy; and the final triumph of Parliament in the overthrow of James II.

4. The History of the Christian Church to the Present Time. The leading topics considered will be: the pre-Constantine church, including the persecution and the formation of a definite ecclesiastical organization; the effects of Constantine's conversion upon the church; the Nicene Creed and the early heresies; the conversion of the barbarians and its reflex action upon the church; Monasticism; the rise of the Papacy; the Mediæval Church at its height; the rise of heresy—Wyclif, Huss, Savonarola; the reformation—Luther, Zwingli, Calvin; the Catholic Reformation; the religious wars of the sixteenth and seventeenth centuries; the Puritans; and a survey of the history of the leading Protestant denominations. The purpose of the course will be to give a clear conception of the history of the church as a whole, not to deal in detail with any single period.

5. United States History. Different subjects for this course may be taken in succeeding years such as; Colonial Possessions of the United States, including a sketch of the history of the Dutch, Spanish and Portuguese colonies, and a comparison of their problems, successes and failures with those of the United States in the Philippines and Porto Rico; the history of the United States from the Missouri Compromise to the outbreak of the Civil war, with especial emphasis upon the years following the compromise of 1850. The students will be expected to present reports upon topics assigned by the instructor; these will form the basis for a critical discussion.

LIBRARY

The Library is under the control of a Library Committee, appointed by the Trustees, of which the President of the University is *ex officio* chairman. The duties of this committee are to advise concerning the arrangement, cataloguing, use of books, and other matters pertaining to the Library not reserved to the Trustees nor otherwise provided for.

LIBRARY COMMITTEE

PRESIDENT G. STANLEY HALL, *Chairman*
PRESIDENT EDMUND C. SANFORD
PROFESSOR WILLIAM E. STORY, *Secretary*

LIBRARY STAFF

LOUIS N. WILSON, *Librarian*

ASSISTANTS

EDITH M. BAKER, *Senior Assistant*

NELLY CUMMING — BESSIE P. SPRAGUE
THEODATE L. SMITH — AMELIA W. TYLER

MARY D. THURSTON, *College Library*

The Library building is situated on the corner of Main and Downing streets. The Public Opening of the new building was held January 14th, 1904. A full description

of the building and of the Proceedings at the Opening will be found in the *Publications of the Clark University Library* for April, 1904 (Vol. 1, No. 3).

The College Library and study rooms are located in the rooms formerly occupied by the University Library in the Main Building.

The Library contains about 50,000 bound volumes and pamphlets, and the reading-room receives over 500 journals.

The books are grouped as follows:

A	Works of General reference	L	Biography
B	Journals	M	Anthropology
C	Mathematics	N	Education
CD	Math.-Physics	O	General science
D	Physics	P	History
DE	Physical Chemistry	Q	Law
E	Chemistry	R	Political and Social Science
F	Biology, Zoölogy, Botany, Physiology, Neurology	S	English
		T	Modern Languages
G	Geography	U	Classics
H	Pathology	W	Practical Arts
I	Psychology	X	Library Science
J	Philosophy	Y	Art
K	Religious Psychology	Z	Manuscripts

Tuesday and Friday mornings, each week, all books recently added to the library are placed upon a table in the Reference section where they remain for three days. This affords the members of the University and College an opportunity to examine the new books in all departments before they are placed upon the shelves for circulation.

About once a month, during term, by the courtesy of our booksellers, new books are placed for inspection on one of the tables in the Reference section. Any member of the University or College may recommend the purchase for the library of books thus displayed, and such recommendation will receive prompt attention.

All books are classified by the heads of departments and particular attention is paid to the needs of students engaged in research work. The library already possesses a good collection of complete sets of the best scientific periodicals. It makes liberal purchases for individual needs and supplements these by drawing upon the resources of the older and larger libraries through the inter-library loan system. During the past year 420 volumes were borrowed from, and 316 volumes lent to, other libraries. The number of books added each year is about four thousand volumes.

The publications of the library, edited by the Librarian, and begun in October, 1903, are as follows:

VOL. I.

No. 1. WILSON, LOUIS N.
Bibliography of the Published Writings of President G. Stanley Hall. Oct. 1903

No. 2. WILSON, LOUIS N.
Bibliography of Child Study for the Year 1902. Jan. 1904

No. 3. Proceedings and Addresses at the Public Opening of the Library Building of Clark University, Thursday, January 14, 1904 Apr. 1904

No. 4. WILSON. LOUIS N.
Bibliography of Child Study for the Year 1903. July 1904

No. 5. WILSON, LOUIS N.
Preparing Manuscript for the Press. Jan. 1905

No. 6. Founder's Day, Clark University. Apr. 1905

No. 7. WILSON, LOUIS N.
Bibliography of Child Study for the Year 1904. July 1905

No. 8. DE PERROT, JOSEPH
The Probable Source of the Plot of Shakespeare's Tempest.
Oct. 1905

No. 9. Proceedings and Addresses at the Public Opening of the Art Department of Clark University. Dec. 1905

VOL. 2.

No. 1. List of Books and Pictures in the Clark Memorial Collection.
July 1906

No. 2. WILSON, LOUIS N.
Bibliography of Child Study for the Year 1905.
Oct. 1906

No. 3. WILSON, LOUIS N.
A few titles in Child Study. Apr. 1907

No. 4. Proceedings at the First Annual Banquet of the New England Association of Alumni of Clark University, and at the Banquet of the Washington, D. C., Alumni Association, 1907.
June 1907

No. 5. WILSON, LOUIS N.
Bibliography of Child Study for the Year 1906.
Aug. 1907

No. 6. WILSON, LOUIS N.
Bibliography of Child Study for the Year 1907.
Sept. 1908

The department of religious psychology, established within the past few years has grown rapidly and supports *The American Journal of Religious Psychology and Education*, of which the third volume has been completed.

The books in the Art Department are accessible on application to the librarian, but, by the terms of the Founder's will, they cannot be taken from the building.

All the privileges of the library are open to all members of the University, and each member has direct access to every book and journal.

The library is open from 8 a.m. to 6 p.m. each week day from Sept. 1 to July 1. During July and August it is open from 8 a.m. to 5 p.m. from Mondays to Fridays, and on Saturdays from 8 a.m. to 12 m. The library is closed July 4th, Thanksgiving Day and Christmas Day.

Outside the University are found:

The Library of the American Antiquarian Society, organized in 1812, and containing over 120,000 volumes, accessible to all members of the University.

The Worcester Public Library, containing 600 newspapers and magazines and 165,000 volumes, has, in the past, to some extent supplemented the scientific publications purchased by the University, and all its privileges are accessible without charge.

The Library of the Worcester District Medical Society of about 10,000 volumes, is also free to all members of the University.

LIBRARY RULES

No loud talking is allowed in any part of the Library.

Every book shall be returned at the end of one calendar month from the time at which it was taken out, but may be called in at any time at the discretion of the Librarian.

Current numbers of periodicals shall not be taken out until they have been in the Library ten days.

All dictionaries, cyclopædias, and books of general reference are permanently reserved.

Reserved books and current numbers of periodicals, exempt from circulation, may be taken out after 5.30 p.m., but must be returned before 9 o'clock the next morning, excepting that such books and periodicals may be taken out Saturdays at 12 o'clock m., and may be kept until 9 o'clock the next Monday morning.

Readers must not write nor make any mark upon any book, manuscript, map, or other property belonging to the Library.

Any breach of the above Rules will involve suspension of the Library privileges until personally restored by the Librarian. All such cases shall be laid before the Library Committee at their next meeting.

ART DEPARTMENT

In his last will and testament the Founder of the University bequeathed

"the sum of $100,000, as an endowment fund for the Art Department of said University, and said sum is to be held and kept sacred and intact as a principal not to be used or expended under any conditions; but the income, interest or proceeds thereof shall be used only in putting and keeping said works of art or others given or obtained for said department in good condition and in taking care of them; and then if there is a surplus of the income of said fund left, I will and direct that it be used in the purchase of additional works of art or of such matters as will add to the usefulness and efficiency of said Art Department."

Under these conditions a large room has been furnished and equipped on the upper floor of the Library Building.

Upon the death of Mrs. Clark, those of the Founder's collections that were deemed most suitable for this purpose were arranged and displayed in this room, together with his most valuable books, which, by the conditions of the will, cannot be removed from the building. A complete catalogue of these books and paintings has been published in the PUBLICATIONS OF THE LIBRARY, Vol. 2, No. 1. A Curator and Custodian of them have been appointed by the Board (see page 98) and all are now accessible to visitors. The Art Department is open daily (except Sundays) from 9 a.m. to 5 p.m.

REGULATIONS

1. All requisitions for apparatus must be made through the Bursar's office upon printed blanks provided for that purpose, and signed by a member of the staff.

2. So far as possible, orders for only the kind and amount of apparatus certain to be used during the year shall be placed; nothing shall be ordered for future years, and apparatus for research shall take precedence over that for teaching and illustration only.

3. Requisitions for repairs, furniture, plumbing and work about the buildings must be made through the Bursar's office in writing and with detail, and when once passed upon, no change involving additional expense can be made in the requisition without the consent of the Finance Committee.

4. No unappropriated rooms and no part of the University grounds shall be used for any purpose, and appropriated rooms shall not be used for other purposes than the stated University work for which they were intended, without previous permission from the office.

5. Unless for special reasons, absence of instructors from their stated exercises or from town for two consecutive week days in term time should be announced at the office, and for longer absence permission should be obtained beforehand.

6. The Trustees desire that no Instructor, Docent, or Fellow shall enter upon other engagements outside his proper work in the University of a kind or amount likely to lessen his full efficiency for science within the University.

7. Appropriations shall hereafter cover all apparatus and supplies of whatever nature for laboratories, for demonstration or illustration; all metal and carpenter work connected with the scientific activity of each department; and every form of special service. Appropriations, however, shall not hereafter cover books or journals, which shall be submitted to the Library Committee.

8. The several appropriations made to individual instructors and others shall be the full and fixed limit of the liability of the University, to be on no account transcended; and for every excess over the appropriations, from whatever cause, the instructor making the order shall be personally responsible.

9. No order for any purpose shall be paid by the University, whether on appropriations or for general supplies, that has not passed through the Bursar's office.

10. The President, Professors, Assistant Professors and regular Instructors authorized by the Board to do graduate work, together with the Librarian, shall constitute the Faculty of the University. Its meetings shall be called and presided over by its President, or, in his absence, by a Professor whom he shall designate. The Faculty shall elect a Secretary and its records shall always be accessible to the Trustees. Its jurisdiction shall include all matters pertaining to the instruction, conduct and discipline of students, and such other duties as may be prescribed by the Trustees.

11. The President of the University shall make, at the October meeting, an annual report on the condition of the departments and their work during the year and shall have authority to require and receive from all Instructors and Officers of the University and Library such reports as he may deem necessary. A copy of these reports, including that of the Library, shall be deposited with the Mayor of the City.

12. The University Faculty shall have the oversight of all graduate work and shall recommend for the Master's, Doctor's and all other graduate degrees upon such terms, conditions, and forms as it may determine, and exercise such other functions and responsibilities as are not expressly assigned to the Trustees or to the Collegiate Department.

13. The Custodian of the Art Collection shall have general oversight over its room in the Library Building and its contents, together with their care and use, under the direction and control of the Curator. The Curator shall from time to time submit to the Trustees his recommendations for the purchase of additional works of art from the income of the Art Fund, based on and together with the opinions of experts as to their value and desirability. All such purchases shall be approved by the Board of Trustees, or by such a committee of their members as they shall appoint for that purpose.

14. The President of the University shall make an annual report to the Trustees of the action of the Library Committee, of which he is Chairman, and this report, if approved, shall be filed and preserved.

DEGREES CONFERRED

On June, 17, 1909, the University conferred degrees upon the following persons:

MASTER OF ARTS

Jesse Bruner
Thesis: Constitutional vitality and vigor of offspring and the physiological conditions which influence it.

Chester Arthur Butman
Thesis: The Zeeman effect treated historically and experimentally.

Charles Schofield Carroll
Thesis: The Catholic confessional; its history, doctrine and psychology.

Edmund Smith Conklin
Thesis: Collegiate religious education.

Lucetta Crum
Thesis: Story telling.

John Edward Dowd
Thesis: The sacrifice of the mass in the Catholic church.

Helen Maher Downey
Thesis: Ambition.

Sakyo Kanda
Thesis: An examination of Buddha's atheism and non-âtmanism.

Mott Albertus Kaylor
Thesis: Feelings, thoughts and conduct of children toward animal pets.

Anna Louise Kranz
Thesis: Studies in the development of student honor and self-government.

James Huff McCurdy
Thesis: Adolescent changes in heart rate and blood pressure.

William Alderman Matheny
Thesis: Effects of alcohol on the life cycle of paramecium.

Owen Wesley Mills
Thesis: The biology of Pellia Epiphylla.

Yasuma Nakamura
Thesis: The formation and genesis of suicidal impulse.

Thomas Francis Power
Thesis: A precise quantitative study of the phenomena of direct esterification.

Carlton Earl Richardson
Thesis: The discontent in India; its causes.

John James Salmon
Thesis: Saint invocation and religious memorials in the Catholic church.

Augusta Wiggam
Thesis: Contribution to the data of dreams.

Clarence Delette Wright
Thesis: A quantitative experimental investigation of the steric hindrance hypothesis.

Doctor of Philosophy

John Franklin Bobbitt
Dissertation: The growth of Philippine children. Pedagogical Seminary, June, 1909, Vol. 16, pp. 137–168.

Louise Ellison
Dissertation: Consciousness in relation to learning.

Burton Noble Gates
Dissertation: Biological studies of the honey bee.

Kyugoro Ishizawa

Dissertation: The war finances of Japan.

Hikozo Kakise

Dissertation: An experimental study on the conscious concomitants of understanding.

John Augustus Magni

Dissertation: The ethnological background of the Eucharist. American Journal of Religious Psychology and Education, March, 1910, Vol. 4, pp. 1–47.

Howard Washington Odum

Dissertation: Religious folk-songs of the southern negroes. American Journal of Religious Psychology and Education, July, 1909, Vol. 3, pp. 265–365.

Eugene Charles Rowe

Dissertation: Voluntary movement.

Inman Lyon Willcox

Dissertation: The psychological aspect of sin and salvation.

The following gentlemen also have taken the examination for the doctor's degree, but have not yet completed all the formal requirements:

Eugene W. Bohannon

A. Caswell Ellis

PUBLICATIONS

A Register and Official Announcement is issued each year in February or March.

In the years 1890, 1891, 1893, and 1902, the annual Report of the President to the Board of Trustees was printed.

A Summer School was held for nine years ending in 1903, and in such years a Summer School Programme was issued.

In July, 1899, the University observed its tenth anniversary, and published the following volume:

Clark University, 1889-1899. Decennial Celebration. 8 x 11 in., pp. 566. Published for the University. Price, $5.00. Contains the lectures delivered by Professors Picard, Boltzmann, Ramon y Cajal, Mosso and Forel at the Decennial Celebration, July, 1899; also reports by the heads of departments on their aims and ideals, with a list of past and present members of the University and the titles of their published papers.

JOURNALS CONNECTED UNOFFICIALLY WITH THE DEPARTMENTS

The American Journal of Psychology. This journal was commenced in November, 1887, and is now edited by G. Stanley Hall, E. C. Sanford, and E. B. Titchener

(Cornell University) with the assistance of an international board of co-operators. Each volume contains four numbers—issued in January, April, July and October. Besides original articles, a considerable portion of its space is devoted to careful digests of the important literature in its field. Price $5 per volume; single numbers, $1.50. Florence Chandler, Publisher, Worcester, Mass.

The Pedagogical Seminary. This journal was begun in January, 1891, and is edited by the President of the University. It is an international record of educational literature, institutions and progress, and is devoted solely to the highest interest of education in all grades, with digests of important literature of all countries. It is the organ of the Educational Department of the University. Each volume contains four numbers—issued in March, June, September and December. Price $5 per volume; single numbers, $1.50. Florence Chandler, Publisher, Worcester, Mass.

The American Journal of Religious Psychology and Education. This journal was begun in May, 1904, and three numbers constitute a volume. It aims to give an account of all the more important books and periodicals in its field, which includes religious education, and publishes original articles. Each number contains about 100 pages. Price, $3.50 per volume, $1.50 per number. Louis N. Wilson, Publisher, Worcester, Mass.

UNIVERSITY COLORS

EMERALD GREEN AND WHITE

To be worn in the hood as a green chevron
on a white field

WAVERLY PRESS
WILLIAMS & WILKINS COMPANY
BALTIMORE

Clark University
in the City of Worcester
Massachusetts

Register and Twenty-third Official Announcement

1911

THE
JOHN CRERAR
LIBRARY

CLARK UNIVERSITY

WORCESTER, MASSACHUSETTS

REGISTER AND TWENTY-THIRD OFFICIAL ANNOUNCEMENT

WORCESTER, MASSACHUSETTS
Published for the University
March, 1911

BOARD OF TRUSTEES

A. George Bullock
Orlando W. Norcross
Francis H. Dewey
Arthur F. Estabrook
Herbert Parker
Lucius Tuttle
Austin S. Garver
Arthur P. Rugg

OFFICERS

President . . .	A. George Bullock
Vice-President and Treasurer	Francis H. Dewey
Secretary . . .	G. Stanley Hall

COMMITTEES

Finance

A. George Bullock
Francis H. Dewey
Arthur F. Estabrook

Buildings

Orlando W. Norcross

CALENDAR 1911-1912

1911		
April 3	Monday	Spring Recess
April 8	Saturday	
April 19	Wednesday	Patriots' Day
May 30	Tuesday	Memorial Day
June 15	Thursday	Twenty-second academic year closes

Summer Vacation of 14 Weeks

Sept. 21	Thursday	Twenty-third academic year begins
Nov. 30	Thursday	Thanksgiving Day
Dec. 20	Wednesday	Christmas Recess
1912		
Jan. 2	Tuesday	
Feb. 1	Thursday	Founder's Day*
Feb. 22	Thursday	Washington's Birthday
April 1	Monday	Spring Recess
April 6	Saturday	
April 19	Friday	Patriots' Day
May 30	Thursday	Memorial Day
June 20	Thursday	Twenty-third academic year closes

*Not a holiday

MEMBERS

STAFF

GRANVILLE STANLEY HALL, PH.D., LL.D. 94 Woodland St.

President of the University and Professor of Psychology

A.B., Williams College, 1867; A.M., 1870; Ph.D., Harvard University, 1878; Lecturer in Harvard and Williams Colleges, 1880–81; Professor of Psychology, Johns Hopkins University, 1881–88; LL.D., University of Michigan, 1888, Williams College, 1889, and Johns Hopkins University, 1902; Chairman of the Library Committee and Curator of the Art Collection, Clark University. Resident Member of the Massachusetts Historical Society.

WILLIAM EDWARD STORY, PH.D. 17 Hammond St.

Professor of Mathematics and Secretary of the Faculty

A.B., Harvard University, 1871; Ph.D., Leipzig, 1875; Parker Fellow (Harvard), 1874–75; Tutor of Mathematics, Harvard University, 1875–76; Associate, Assistant Professor, and Associate Professor of Mathematics, Johns Hopkins University, 1876–89; Professor of Mathematics, Clark College, 1902–07. Member of the National Academy of Sciences; Member of the London Mathematical Society; Resident Fellow of the American Academy of Arts and Sciences.

EDMUND CLARK SANFORD, PH.D., SC.D.

Lecturer on College Administration 96 Woodland St.

A.B., University of California, 1883; Fellow, Johns Hopkins University, 1887; Ph.D., Johns Hopkins University, 1888; Instructor in Psychology, Johns Hopkins University, 1888; Instructor in Psychology, Clark University, 1889-92; Assistant Professor, 1892–1900; Professor of Psychology, Clark College, 1903–07; Professor of Experimental and Comparative Psychology, Clark University, 1900-09; Sc. D., Hobart College, 1909; President of Clark College, 1909-.

ARTHUR GORDON WEBSTER, PH.D., SC.D., LL.D.

Professor of Physics 66 West St.

A.B., Harvard University, 1885; Instructor in Mathematics, Harvard University, 1885-86; Parker Fellow, 1886-89; Student, Universities of Berlin, Paris, Stockholm, 1886-90; Ph.D., University of Berlin, 1890; Docent in Physics, Clark University, 1890–92; Assistant Professor, 1892–1900; Professor of Physics, Clark College, 1902–07; Director of Physical Laboratories; D.Sc., Tufts College, 1905; LL.D., Hobart College, 1908. Member of the National Academy of Sciences; Resident Fellow of the American Academy of Arts and Sciences; Member of the American Philosophical Society.

HENRY TABER, PH.D.

Professor of Mathematics — 65 West St.

Ph.B., Yale University, 1882; Ph.D., Johns Hopkins University, 1888; Assistant in Mathematics, Johns Hopkins University, 1888–89; Docent in Mathematics, Clark University, 1889-92; Assistant Professor, 1892–1903. Member of the London Mathematical Society; Resident Fellow of the American Academy of Arts and Sciences.

CLIFTON FREMONT HODGE, PH.D.

Professor of Biology — 103 May St.

A.B., Ripon College, 1882; Fellow in Biology, Johns Hopkins University, 1888–89; Ph.D., Johns Hopkins University, 1889; Fellow in Psychology and Assistant in Neurology, Clark University, 1889-91; Instructor in Biology, University of Wisconsin, 1891–92; Assistant Professor of Physiology and Neurology, Clark University, 1891–1906; Professor of Biology, Clark College, 1902–.

WILLIAM HENRY BURNHAM, PH.D.

Professor of Pedagogy and School Hygiene — 17 Circuit Ave.

A.B., Harvard University, 1882; Instructor in Wittemberg College, 1882–83; Instructor, State Normal School, Potsdam, N. Y., 1883–85; Fellow, Johns Hopkins University, 1885–86, Ph.D., 1888, and Instructor in Psychology, 1888-89; Docent in Pedagogy, Clark University, 1890–92; Instructor, 1892–1900; Assistant Professor 1900-06.

ALEXANDER FRANCIS CHAMBERLAIN, PH.D.

Assistant Professor of Anthropology — 19 Baker St.

B.A., University of Toronto, 1886; M.A., 1889; Fellow in Modern Languages, University College, Toronto, 1887-90; Librarian, Canadian Institute, Toronto, 1889–90; Fellow in Anthropology, Clark University, 1890–92; Ph.D., Clark University, 1892; Lecturer in Anthropology, Clark University, 1892-1900; Acting Assistant Professor, 1900–04; Editor, *Journal of American Folk-Lore*, 1900-1907; Corresponding Member O Instituto de Coimbra, Portugal; Member of the American Antiquarian Society; Honorary Member American Folk-Lore Society; Fellow American Ethnological Society; Contributor to *Encyclopedia Britannica* (11th Ed.)

MARTIN ANDRE ROSANOFF, SC.D.

Assistant Professor of Chemistry — 7 Downing St.

Ph.B., New York University, 1895; Sc.D., 1908; Student, University of Berlin, 1895–96; University of Paris, 1896–98; Research Fellow, New York University, 1899-1900; Instructor in Theoretical Chemistry, New York University, 1904-05; Assistant Professor of Chemistry 1905–07; Assistant Professor of Organic Chemistry, Clark College, 1907–10; Professor 1910–; Director of Chemical Laboratories; Fellow of the American Association for the Advancement of Science; Nichols Medalist of the American Chemical Society.

JOHN WALLACE BAIRD, PH.D. 17 Circuit Ave.

Assistant Professor of Experimental Psychology

A.B., University of Toronto, 1897; University of Leipzig, 1898–99; Fellow, University of Wisconsin, 1899–1901: Fellow, Cornell University, 1901–02; Ph.D., 1902: Assistant in Psychology, 1902–03; Carnegie Research Assistant, 1903–04; Instructor in Psychology, Johns Hopkins University, 1904–06: Instructor in Psychology, University of Illinois, 1906–07; Assistant Professor, 1907–February, 1910.

JOSEPH DE PEROTT

Lecturer in Mathematics 5 Hawthorn St.

Student, Universities of Paris and Berlin, 1877–80.

LOUIS N. WILSON, LITT.D. 11 Shirley St.

Librarian of the University and Custodian of the Art Collection

Litt.D., Tufts College, 1905.

BENJAMIN SHORES MERIGOLD, PH.D.

Instructor in Chemistry 25 Chatham St.,

A.B., Harvard University, 1896; A.M., 1897; Ph.D., 1901; Assistant in Chemistry Harvard University, 1896–1900; Instructor in Chemistry, Worcester Polytechnic Institute, 1900–03; Assistant Professor of Chemistry, Clark College, 1903–08; Professor, 1908–.

GEORGE HUBBARD BLAKESLEE, PH.D.

Instructor in History 24 Richards St.

A.B., Wesleyan University, 1893; A.M., Harvard University, 1899; Ph.D., 1903; Student, Johns Hopkins University, 1893–94; Parker Fellow, Harvard, 1901–02; Student, Universities of Berlin, Leipzig, and Oxford, 1901–03; Instructor in History, Clark College, 1903–04; Assistant Professor, 1904–09; Professor, 1909–.

FRANK HAMILTON HANKINS, PH.D.

Instructor in Economics and Sociology 4 Cabot St.

A.B., Baker University, 1901; Student, Columbia University, 1903–1904; Scholar in Sociology, 1904–1905; Fellow in Statistics, 1905–1906; Student, 1907–08; Ph.D., Columbia University, 1908; Instructor in Economics, Clark College, 1906–07; Assistant Professor, 1908–.

JOHN CHARLES HUBBARD, PH.D.

Instructor in Physics 8 Loudon St.

B. S. ,University of Colorado, 1901; Scholar in Physics, Clark University, and Assistant to Professor Webster, 1901-02; Fellow, 1902-04; Ph. D., Clark University, 1904; Instructor in Physics, Simmons College, 1904-05; Asssistant Professor of Physics, New York University, 1905-06; Assistant Professor of Physics, Clark College, 1906–; Honorary Fellow in Physics, Clark University, 1907-09.

JAMES PERTICE PORTER, PH.D.
Instructor in Psychology 60 Lovell St.

A.B., Indiana University, 1898; A.M., 1901; Instructor in Psychology, Indiana University, 1900–03; In Charge of Work in Neurology, Indiana University Biological Station, 1891 and 1903; Honorary Fellow in Psychology, Clark University, 1903–09; Ph.D., Clark University, 1906; Instructor in Psychology, Clark College, 1903–07; Assistant Professor, 1907–09; Assistant Professor and Dean, 1909—.

FRANK BLAIR WILLIAMS, PH.D.
Instructor in Mathematics 2 Isabella St.

C.E., University of Missouri, 1890; M. S., 1893; Engineering Work with the Mississippi River Commission, 1890–92; Teaching Fellow in Mathematics, University of Missouri, 1892–93; Survey Work with the Mississipi River Commission, 1894–95; United States Assistant Engineer in Tennessee River Improvement, 1895–97; Scholar in Mathematics, Clark University, 1897–98; Fellow, 1898–1900; Ph.D., 1900; Honorary Fellow, 1909–10; Assistant Professor of Civil Engineering, Union College, 1900–05; Assistant Professor of Engineering and Mathematics, 1905–06; Professor of Engineering Mathematics, 1906–07; Assistant Professor of Mathematics, Clark College, 1907–08; Professor, 1908–.

ANNUAL APPOINTMENTS

EDWARD COWLES, M.D., LL.D., Boston
Non-Resident Lecturer in Psychiatry

A.B., Dartmouth College, 1859; A.M., 1863; Medical House Pupil, Retreat for the Insane, Hartford, Conn., 1860–62; M.D., Dartmouth Medical School, 1863; M.D., College of Physicians and Surgeons, New York, 1863; Medical Corps, United States Army, 1863–72; Resident Physician and Superintendent, Boston City Hospital, 1872–79; Medical Superintendent, McLean Hospital, Waverley, Mass., 1879–1903; Lecturer on Mental Diseases, Dartmouth Medical School, 1885–86; Professor of Mental Diseases, 1886–; Fellow by Courtesy, Johns Hopkins University, 1887–88; Clinical Instructor in Mental Diseases, Harvard Medical School, 1888–; LL.D., Dartmouth College, 1890.

ARTHUR AMOS NOYES, Ph.D., Sc.D., LL.D., Boston
Non-Resident Lecturer in Chemical Research

S.B., Massachusetts Institute of Technology, 1886; S.M., 1887; Ph.D., University of Leipzig, 1890; Assistant and Instructor in Chemistry, Massachusetts Institute of Technology, 1887–88 and 1890–94; Assistant Professor, 1894–99; Professor and Director of the Research Laboratory of Physical Chemistry, 1899—. Member of the National Academy of Sciences.

ROBERT HARVEY CLARK, PH.D.
Docent in Chemistry 28 Hollywood St.

A.B., University of Toronto, 1905; A.M., 1906; Assistant in Chemistry, 1905–06; 1851 Exhibition Science Research Scholar, University of Leipzig 1906–09; PhD, University of Leipzig, 1908; Acting Assistant Professor of Chemistry, Clark College, 1909–10; Assistant Professor, 1910—.

Dennis Francis O'Connor, M.D.
Lecturer in the Children's Institute 25 Portland St.

A.B., College of the Holy Cross, 1893; A.M., 1899; M.D., College of Physicians and Surgeons, Baltimore, 1898; University of Vienna, 1900–02; Fellow in Psychology, Clark University, 1909–10. Member of the Massachusetts Medical Society and American Medical Association.

Theodate Louise Smith, Ph.D. 23 Maywood St.
Lecturer and Librarian in the Children's Institute

A.B., Smith College, 1882; A.M., 1884; Yale University, 1893–1895; Special Student, Clark University, 1895–96; Ph.D., Yale University, 1896; Cornell University, 1900; Assistant to President Hall in research work under Carnegie grant, Clark University, 1992-04; Estabrook grant, October 1904–February 1905; Berlin University, April-August, 1905; Research Assistant to President Hall, Clark University, 1905-09.

Amy Eliza Tanner, Ph.D., Faribault, Minnesota
Lecturer in the Children's Institute 90 Florence St.

A.B., University of Michigan, 1893; Scholar, University of Chicago, 1894–95; Fellow, 1895–98; Ph.D., University of Chicago, 1898; Associate in Philosophy, 1898-1902; Professor of Philosophy, Wilson College, 1903-07; Honorary Fellow in Psychology, Clark University, 1907–09.

Alexis Bolgar, Ph.D., Dunellen, New Jersey
Docent in Economics 3 Beaver St.

D.Jur., University of Klausenburg, 1906; Ph.D., University of Berne, 1910.

Honorary Fellows

Rudolph Acher, Ph.D. 101 May St.
Honorary Fellow in Psychology and Assistant in Children's Institute

A.B., Indiana University, 1908; Fellow in Psychology, Clark University, 1908–10; Ph. D., 1910.

Arthur Dexter Butterfield, A.M.
Honorary Fellow in Mathematics 10 Schussler Road

B.S., Worcester Polytechnic Institute, 1893; M.S., 1898; A.M., Columbia University, 1904; Instructor in Civil Engineering, Worcester Polytechnic Institute, 1894–98; Instructor in Mathematics, Engineering Department, University of Vermont, 1898–1900; Assistant Professor, 1900–04; Professor of Mathematics and Mechanics, 1904–08; Assistant Professor of Mathematics, Worcester Polytechnic Institute, 1908–10; Professor, 1910–; Student in Physics and Mathematics, Clark University, 1908–09; Honorary Fellow in Mathematics, 1909–10;

ELNORA WHITMAN CURTIS, PH.D.

Honorary Fellow in Psychology — Burncoat St.

A.B., Smith College, 1892; Scholar in Psychology, Clark University, 1907-08; A.M., 1908; Honorary Fellow in Psychology, 1908–10; Ph.D., 1910.

FRANK DREW, PH.D.

Honorary Fellow in Pedagogy — 43 Hollywood St.

A.B., Indiana University, 1890; A.M., 1891; Scholar in Clark University, 1892–93; Fellow, 1893–95; Ph.D., 1895; Instructor in Psychology, Indiana University, 1895–96; Instructor in Psychology and School Hygiene, State Normal School, Worcester, 1896–1908; Lecturer in Secondary Education, Wellesley College, 1910.

HIKOZO KAKISE, PH.D., Oitaken, Japan

Honorary Fellow in Psychology — 76 Woodland St.

Graduate, Tokyo Imperial University, 1901; Assistant in Psychology, 1902-06; Fellow in Psychology, Clark University, 1906–07; Research Assistant to Professor Sanford, 1907–09; Ph.D., Clark University, 1909; Honorary Fellow in Psychology, Sept., 1909–Jan., 1911.

CHAUNCEY ALLAN LYFORD, A.M.

Honorary Fellow in Chemistry — 162 May St.

B.S., Worcester Polytechnic Institute, 1903; Fellow in Biology, Clark University, 1903–05; Scholar in Chemistry, 1905–06; A.M., 1906; Honorary Scholar in Chemistry, 1906–07; Fellow, 1907–08; Assistant in Chemistry and Biology, Clark College, 1904–05; Assistant in Chemistry, 1905–08; Instructor, 1908–.

HENRY CHASE MARBLE, M.D.

Honorary Fellow in Biology — 18 Tirrell St.

A.B., Clark College, 1906; M.D., Harvard Medical School, 1910.

CAREY EYSTER MELVILLE, A.B.

Honorary Fellow in Mathematics — 101 May St.

A.B., Northwestern University, 1901; Fellow in Mathematics, 1901–02; Graduate Student in Mathematics, Johns Hopkins University, 1902–03; Instructor in Mathematics, Case School of Applied Science, 1903–06; Honorary Fellow in Mathematics, Clark University, 1906–10; Assistant in Mathematics, Clark College, 1906–09; Instructor in Mathematics, 1909–10; Instructor in Mathematics and Physics, 1910–.

MAURICE WALTER MEYERHARDT

Honorary Fellow in Psychology — 5 Clayton St.

Student at Koeluisches Gymnasium, Berlin, seven years; Student in Psychology, Clark University, 1903–04; Scholar, 1904–07; Fellow, 1907–09; Honorary Fellow, 1909–10.

Newton Miller, Ph.D., Thorntown, Indiana
Honorary Fellow in Biology 78 Florence St.

A.B., Indiana University, 1905; A.M., 1906; Fellow in Biology, Clark University, 1906–08; Ph.D., 1908; Instructor in Biology, Clark College, 1908–; Honorary Fellow in Biology, Clark University, 1908–10.

Thomas Lansing Porter, Ph.D., Evanston, Illinois 8 Loudon St.
Honorary Fellow in Physics and Research Assistant to Professor Webster

B.S., Northwestern University, 1907; Laboratory Assistant in Physics, 1906–07; Research Assistant to Professor Webster, Clark University, 1907–08; A.M., Clark University, 1908; Instructor in Physics, Clark College, 1908–09; Honorary Fellow in Physics, Clark University, 1908–10; Research Assistant to Professor Webster, 1909–10; Ph.D., Clark University, 1910.

Walter Franklin Robie, M.D., Baldwinville 105 Pleasant St.
Honorary Fellow in Psychology and Biology

A.B., Dartmouth College, 1889; M.D., Dartmouth Medical School, 1893; Assistant Physician, Hospital Cottages, 1892–94; Supt. Riverview Sanitarium, 1902–07; Pine Terrace Sanitarium, 1907–; Student in Psychology and Biology, Clark University 1904–05; Honorary Fellow, 1905–10.

Fellows and Scholars

Emmanuel Anastassoff, A.M., Kustendil, Bulgaria
Fellow in Pedagogy 20 Woodland St.

Graduate, Normal School, Kustendil, 1902; Pd.B., Valparaiso University, 1909; A.M., Indiana University, 1910.

Charles Walter Bacon,* A.M., North Oxford
Fellow in Chemistry

A.B., Clark College, 1906; Scholar in Chemistry, Clark University, 1906–08; A.M., 1907; Assistant in Chemistry, Clark College, 1907–09; Honorary Fellow in Chemistry and Research Assistant to Professor Rosanoff, 1908–09; Fellow in Chemistry Clark University, 1909–10.

Guy Gaillaird Becknell, M.S., Goshen, Indiana
Fellow in Physics 34 Gates St.

B.S., Northwestern University, 1904; M.S., 1905; Fellow in Physics, 1905; Assistant Instructor in Physics, Purdue University, 1905–06; Instructor, 1906–08; Research Assistant to Professor Webster, Clark University, 1908–09; Fellow in Physics, 1909–10.

*Non-resident during part of the year.

George Davis Bivin, A.M.
Fellow in Psychology — 7 Shirley Terrace

A.B., Clark College, 1909; Scholar in Psychology, Clark University, 1909–10; A.M., 1910.

Marion Genevieve Boland, A.M.
Fellow in Psychology — 152 Beacon St.

Student, Vassar College, 1898–99; A.B., University of Maine, 1902; Student, Massachusetts Institute of Technology, 1904–06; Scholar in Psychology, Clark University, 1909–10, A.M., 1910.

Thomas Charles Carrigan, A.M.
Fellow in Psychology — 17 Orne St.

A.B., Boston College, 1895; Scholar in Psychology, Clark University, 1909–10; A.M., 1910.

Floyd Earle Chidester, A.M., Newark Valley, New York
Fellow in Biology — 24 Beaver St.

Ph.B., Syracuse University, 1907; Assistant in Biology, 1906–07; Scholar in Biology, Clark University, 1907–08; A.M., 1908; Fellow in Anatomy and Zoölogy and Assistant in Histology, University of Chicago, 1908–09; Instructor in Biology, De Pauw University, 1909–10.

Edmund Smith Conklin, A.M. — 78 Florence St.
Fellow in Psychology

Bachelor of Humanics, Y. M. C. A. Training School, Springfield, Mass., 1908; Scholar in Psychology, Clark University, 1908–09; A.M., 1909; Fellow, 1909–10.

Herbert Carroll Cooley, A.M., Ypsilanti, Michigan
Fellow in Psychology — Millbury

Pd.B., Michigan State Normal College, 1906; A.B., 1907; Graduate Student, Boston University, 1907–08; Harvard University, 1908–09; A.M., February 1911; Fellow in Psychology, Clark University, 1909–10.

James Austin Coss, M.S., Arrowsmith, Illinois
Fellow in Chemistry — 28 Maywood St.

B.S., Illinois Wesleyan University, 1903; Professor of Chemistry, Upper Iowa University, 1905–08; Assistant in Chemistry, University of Illinois, 1908–10; M.S., University of Illinois, 1910.

Erwin Oliver Finkenbinder, A.B., Kent, Illinois
Fellow in Psychology — 46 Maywood St.

Graduate, Northern Illinois State Normal School, 1908; A.B., University of Illinois, 1910.

Sara Carolyn Fisher, A.M., Galesburg, Illinois
Fellow in Psychology 2 Woodbine St.

A.B., Lombard College, 1909; A.M., University of Illinois, 1910.

John Madison Fletcher, A.M., Nashville, Tennessee
Fellow in Psychology 21 Shirley St.

A.B., Vanderbilt University, 1901; A.M., University of Colorado, 1904; Assistant in Education, 1905–06; Assistant in Philosophy, Leland Stanford, Jr., University, 1909–10.

Robert Hutchings Goddard, A.M.
Fellow in Physics 1 Maple Hill

B.S., Worcester Polytechnic Institute, 1908; Instructor in Physics, 1908–09; Student in Physics, Clark University, 1908–09; Fellow in Physics, 1909–10; A.M., 1910.

Robert Singleton Hart, Jr., A.M. Pisgah, Kentucky
Fellow in Chemistry 78 Florence St.

A.B., State University, Lexington, Ky., 1907; B.S., 1909; Fellow in Chemistry, Clark University, 1909–10; A.M., 1910; Assistant in Chemistry, Clark College, 1910—.

Louis Dunton Hartson, Pd.M., Ottumwa, Iowa
Fellow in Psychology 78 Florence St.

Ph.B., Grinnell College, 1908; Fellow in Pedagogy, School of Pedagogy, New York University, 1908–09; Pd.M., 1909; Scholar in Psychology, Columbia University, 1909–10.

Henry Heitmann, Ph.B.
Fellow in Psychology 941 Main St.

Ph.B., University of Michigan, 1899.

Frank Eugene Howard, A.B., Manchester, Michigan
Fellow in Psychology Millbury

Pd.B., Michigan State Normal College, 1907; A.B., 1910.

Karl Johan Karlson, A.M., Myresjo, Sweden
Fellow in Psychology 6 Wyman St.

A.B., Clark College, 1909; Scholar in Psychology, Clark University, 1909–10; A.M., 1910.

Solomon Lefschetz, M.E., Paris, France
Fellow in Mathematics 5 May St.

Ingenieur, École Centrale, Paris, 1905.

FRANK ALANSON LOMBARD, A.M., Sutton
Fellow in Pedagogy 28 Hollywood St.

A.B., Amherst College, 1896; A.M., 1900; Professor of Literature and Pedagogy, Doshisha College, Kyoto, Japan, 1900– ; Dean, 1904–10; Fellow in Pedagogy, Clark Univeristy, 1903–04; Lecturer in English Literature, Kyoto Imperial University, 1908–.

JOHN MILTON MCINDOO, A.M., Broken Bow, Nebraska
Fellow in Pedagogy 58 Woodland St.

A. B., Antioch College, 1900; Instructor in English, Antioch College, 1899–1900; Instructor in Psychology and Pedagogy, Chattanooga Normal School, 1900–01; Instructor in Psychology and Pedagogy, Northern Illinois Normal School, 1901–03; Instructor in Pedagogy and English, Junior State Normal School, Broken Bow, Neb., 1906–09; Scholar in Pedagogy, Clark University, 1909–10; A.M., 1910.

GEORGE WILLIAM MACKAY, A.B., Formosa, Japan
Fellow in Psychology 17 Kilby St.

A.B., Clark College, 1910.

WILLIAM ALDERMAN MATHENY, A.M., Athens, Ohio
Fellow in Biology 1 Kilby St.

Ph.B., Ohio University, 1908; Assistant in Botany and Bacteriology, Clark College 1908–; Fellow in Biology, Clark University, 1908–10; A.M., 1909.

WILLIAM JOHN MONTGOMERY, A.M.
Fellow in Mathematics 7 Barbour St.

A.B., Clark College, 1907; Scholar in Mathematics, Clark University, 1907–09; A.M., 1908; Fellow, 1909–10.

HENRY BROWN MOYLE, M.B., Burlington, Canada
Fellow in Psychology and Assistant in Children's Institute
46 Woodland St.

A.B., McMaster University, 1906; M.B., University of Toronto, 1910.

LEONARD BLAINE NICE, PH.B.
Fellow in Biology 32 Lovell St.

Ph.B., Ohio University, 1908; Assistant in Physiology and Hygiene, Clark College, 1908–; Scholar in Biology, Clark University, 1908–09; Fellow in Biology, 1909–10.

ROY FRANKLIN RICHARDSON, A.B., Emporia, Kansas
Fellow in Psychology 7 Fairfield St.

A.B., Kansas Normal College, 1909.

George Herbert Shafer, A.B., Edinboro, Pennsylvania
Fellow in Psychology 85 Woodland St.

A.B., University of Chattanooga, 1906; Instructor in Pedagogy, Edinboro (Pa.) State Normal School, 1908–10.

Collye Fredward Sparkman, A.B., Bone Cave, Tennessee
Fellow in Psychology 80 Woodland St.

B.S., Burritt College, 1906; Pd.B., Valparaiso University, 1908; A.B., Burritt College, 1910.

Simeon Spidle, B.D., Holden
Fellow in Psychology

A.B., Acadia University, 1897; B.D., Newton Theological Institution, 1903; Fellow in Psychology, Clark University, 1908–10.

Asa George Steele, LL.D., Columbia, Missouri
Fellow in Psychology 41 Clifton St.

B.S., University of Missouri, 1901; Professor of Physics and Chemistry, University of Chattanooga, 1904–05; Professor of Sciences, Ogden College, 1906–07; President, Clarksville College, 1907–08; LL.D., Bowdon College, 1908; Professor of Mathematics and Sciences, Western Union College, 1908–10.

Tadaïchi Ueda, A.M., Kyoto, Japan
Fellow in Psychology 32 Lovell St.

Graduate, Doshisha Theological Seminary, Kyoto, Japan, 1907; Student, Union Theological Seminary, 1907–08; Fellow in Psychology, Clark University, 1909–10; A.M., 1910.

Miriam Van Waters, A.M., Portland, Oregon
Fellow in Psychology 483 Park Ave.

A.B., University of Oregon, 1908; A.M., 1910.

Harry Porter Weld, Ph.B., Nashville, Tennessee
Fellow in Psychology and Research Assistant to Dr. Baird
11 Benefit St.

Ph.B., Ohio State University, 1900; Graduate in Music, Dennison University, 1900; Professor of Music, Peabody College for Teachers, University of Nashville, 1900–; Fellow in Psychology, Clark University, 1909–10.

Ida Kirtley Wood, B.S., Horse Cave, Kentucky
Fellow in Psychology 22 Florence St.

B.S., National University, 1892.

Moses Edwin Wood, A.B., Horse Cave, Kentucky
Fellow in Psychology 22 Florence St.
A.B., National University, 1894.

Clarence Delette Wright, A.M., Graniteville
Fellow in Chemistry and Research Assistant to Professor Rosanoff 16 May St.
A.B., Clark College, 1908; Fellow in Chemistry, Clark University, 1908–10; A.M. 1909; Assistant in Chemistry, Clark College, 1909–10.

Sohichi Yamada, A.B., Shizuoka, Japan
Fellow in Pedagogy 9 Woodbine St.
Graduate, Aoyama College, Tokyo, Japan, 1906; A.B., De Pauw University, 1910.

Samuel Claman, Fitchburg
Scholar in Pedagogy 48 Hollywood St.

Edwin Leavitt Clarke, A.B.
Scholar in Sociology 24 Beaver St.
A.B., Clark College, 1909; Assistant in Economics and Sociology, Clark College, 1910—.

Alice Harper Damon, A.B., Concord
Scholar in Biology 7 Hancock St.
A.B., University of Michigan, 1890; Instructor, Potsdam (N. Y.) State Normal School, 1905–10.

Benjamin George Dubois, Keene, New Hampshire
Scholar in Pedagogy 921 Main St.

Paul Sumner Emerson, B. S., Brattleboro, Vermont
Scholar in History 46 Maywood St.
B.S., Norwich University, 1910.

Pierce James Fleming, A.B.
Scholar in Psychology 117 Vernon St.
A.B., College of the Holy Cross, 1910.

Harold Francis Fuller, A.B.
Scholar in Physics 51 Wellington St.
A.B., Clark College, 1910.

ARTHUR OLIN GRIGGS, PH.B., Westford, Connecticut
Scholar in Pedagogy — 87 Woodland St.

Ph.B., Wesleyan University, 1898; Professor of Mathematics, Virginia Union University, 1903–05; Scholar in Pedagogy, Clark University, 1906–07.

ERNEST HAMMOND, PD.B., Milan, Ohio
Scholar in Pedagogy — 7 Clifton St.

Pd.B., Ohio University, 1910.

IRVING ARLINGTON HINKLEY, A.B.
Scholar in Economics — 3 Benefit Terrace

A.B., Clark College, 1910.

FLORANCE HARRISON HOUGH, PD.B., Jamestown, Ohio
Scholar in Psychology — 21 Bancroft

A.B., Ohio University, 1909; Pd.B., 1910.

HERBERT KNOWLTON LARKIN, B. S.
Scholar in Chemistry — 29 Oread Place

B.S., Amherst College, 1900; Scholar in Chemistry, Clark University, 1909–10.

FREDERICK THOMAS MAYER-OAKES, PH.D., Penalosa, Kansas
Scholar in Anthropology — Berlin

A.B., Dexter College, 1905; A.M., Leander Clark College, 1908; M.Sc., 1910; Graduate Student in Anthropology, Yale University, 1909–10; Ph.D., Kansas City University, 1910; Member American Anthropological Association.

CURTIS HUGH MORROW, A.B.
Scholar in History — 4 Dudley Place

A.B., Clark College, 1910; Assistant in History, Clark College, 1910–.

WALLACE FRANK POWERS, A.B., Spencer
Scholar in Physics — 6 Charlotte St.

A.B., Clark College, 1910; Assistant in Physics, Clark College, 1910—.

ALLAN GALE RICE, A.B.
Scholar in History — 862 Main St.

A.B., Clark College, 1910.

KIRKMAN KENSON ROBINSON, A.M., Wilderville, Oregon
Scholar in Psychology — 20 Woodland St.

A.B., University of Oregon, 1907; A.M., 1908.

Barbara Elisabeth Roethlein, Bamberg, Germany
Scholar in Psychology — 2 Woodbine St.

Lehrerinnenexamen in Bamberg am kgl. Lehrerseminar, 1908; Student in Psychology, Clark University, 1909–10.

Robert Luther Sibley, A.B., Spencer
Scholar in Chemistry — 6 Charlotte St.

A.B., Clark College, 1910.

Claude Leander Smith, A.B., York, Pennsylvania
Scholar in History — 20 Woodland St.

A.B., Antioch College, 1909.

Adele Adams Steele, A.B., Columbia, Missouri
Scholar in Pedagogy — 41 Clifton St.

A.B., Potter College, 1907; Principal, Normal Department, Western Union College, 1909–10.

Harold Frederic Stimson, A.B., Rochdale
Scholar in Physics — 8 Loudon St.

A.B., Clark College, 1910.

Thomas Francis Sullivan, A.B.
Scholar in Psychology — 40 Chandler St.

A.B., College of the Holy Cross, 1910.

Joseph Brainerd Thrall, A.B., Leicester
Scholar in Psychology

A. B., Amherst College, 1873; Student, University of Leipzig, 1875-76; Student, Yale Divinity School, 1876–78, Scholar in Psychology, Clark University, 1908–10.

Frederick Henry Tracy, A.B.
Scholar in Psychology — 16 Ingalls St.

A.B., College of the Holy Cross, 1910.

Ralph Hatheway White, A.B., Oxford
Scholar in Chemistry — 38 Maywood St.

A.B., Clark College, 1910.

Elizabeth Lindley Woods, A.M., Portland, Oregon
Scholar in Psychology — 483 Park Ave.

A.B., University of Oregon, 1905; Assistant Instructor in English Literature, 1905–1906; A.M., 1910.

Allan Hutchison Bissell, West Sutton
Student in Psychology — 2 Ripley Place.

James Atkins Bullard, A.B., East Orange, New Jersey
Student in Mathematics — 7 William St.

A. B., Williams College, 1908; Instructor in Mathematics, Worcester Polytechnic Institute, 1908–; Student in Mathematics, Clark University, 1908–10.

Teresa Larkin Carroll
Student in Psychology — 921 Main St.

Graduate, State Normal School, Worcester, 1891.

Thomas Joseph Cross, A.M.
Student in Psychology — 24 Russell St.

A. B., New Windsor College, 1889; A. M., 1892; Student in Psychology, Clark University, 1908–09; Student in Biology, 1909–10.

Bertha Caroline Downing, M.D., Arlington
Student in Anthropology — 4 Downing St.

Harvard Annex, 1884; M. D., Woman's Medical College of Pennsylvania, 1896; Honorary Fellow in Psychology and Biology, Clark University, 1905–06; Honorary Fellow in Psychology, 1906–07; Student in Psychology, 1909–10; A.M., 1910; Member of New England Hospital Medical Society; Fellow of American Academy of Medicine.

Robert Wayland Dunbar, S.T.B., Millbury
Student in Psychology

A.B., Amherst College, 1895; S.T.B., Andover Theological Seminary, 1898.

Idelle Lydia Edmands, M.D., North Brookfield
Student in Psychology

M.D., Woman's Medical College, Northwestern University, 1897

Robert Thomas Elliott, A.B.
Student in History — 14 Pelham St.

A.B., Amherst College, 1897; Scholar in History, Clark University, 1909–10.

Robert John Floody, D.D.
Student in Psychology — 43 Endicott St.

Graduate, Teachers' Training School, Ontario, 1882; B. S., Albion College, 1890; M. S. 1894; S. T. B., Boston University, 1894; Student in Philosophy, Clark University, 1904–06; Honorary Scholar, 1906–07; Student, 1907–10; D.D., Albion College, 1910. Member of American Association for the Advancement of Science.

McLeod Harvey, A.B.
Student in Psychology 33 Clifton St.

A. B., Dalhousie College, 1889; Graduate in Theology, Presbyterian College, Halifax, 1891; Student in Philosophy, Clark University, 1902-06; 1907-08; Student in Psychology, Clark University, 1908-10.

Alice Berg Hayes, A.B., East Brookfield
Student in Mathematics

A.B., University of Oregon, 1910.

Ethelyn Flora Holland
Student in Psychology 3 Beaver St.

Edna Adda Howard, Millbury
Student in Psychology

Graduate, Michigan State Normal College, 1907.

Howard Fifield Legg, B.D.
Student in Psychology 19 Mayfield St.

A.B., Wesleyan University, 1904; B.D., Drew Theological Seminary, 1907.

Arthur Monroe, A.B., Spencer
Student in History 368½ Main St.

A. B., Amherst College, 1897.

William Leander Muttart, B.D., Auburn
Student in Psychology

B.D., Bangor Theological Seminary, 1894; A.B., Lebanon University, 1896; Student in Psychology, Clark University, 1909-10.

Edgar Peleg Neal, A.B., West Boylston
Student in Chemistry

A.B., Colby College, 1893.

Robert Oehme, Ph.D., Berlin, Germany
Student in Psychology Worcester Academy

Ph.D., University of Berlin, 1908.

Nellie Mann Opdale, Marlboro
Student in Psychology

Student in Psychology, Clark University, 1907-10.

William Bryant Perry, B.D.
Student in Psychology 13 Parker St.
B.D., Bishop Payne Divinity School, Va., 1898; A.B., Lotta University, N. C., 1908.

Cleone Post
Student in Psychology 921 Main St.

Charles Moen Rice, A.B.
Student in Mathematics 9 Bowdoin St.
A.B., Harvard University, 1882; Student in Mathematics, Clark University, 1909–10.

Louise Place Rosanoff, A.M.
Student in Psychology 7 Downing St.
A.B., Columbia University, 1896; A.M., 1900; Student in Psychology, Clark University, 1909–10.

George Gordon Sampson, A.B.
Student in Economics 27 Gates St.
A.B., Bates College, 1905; Student in Economics, Clark University, 1909–10.

Edward Butler Saunders, A.B., Fitchburg
Student in Psychology
B.D., St. Lawrence University, 1900; A.B., 1904; Student in Psychology, Clark University, 1906–10.

Myrtle Smith, M.D.
Student in Psychology 831 Main St.
M.D., Tufts Medical School, 1905; Student in Psychology, Clark University, 1909–10.

Frances Washington Tufts, A.B.
Student in Biology 562 Pleasant St.
A.B., Wellesley College, 1909.

Mary Alice Waite, A.B.
Student in Economics and Pedagogy 105 Elm St.
A.B., Smith College, 1904.

Mabel Minerva Young, A.M.
Student in Mathematics 28 Merrick St.
A.B., Wellesley College, 1898; A.M., Columbia University, 1899; Instructor in Mathematics, Wellesley College, 1907—

Attendants upon Saturday Courses

John A. Bergin, Oxford
Ira T. Chapman, Millbury
Winter X. Crider, Worcester
Charles A. Crowell, Jr., Uxbridge
Myrta Alice Little, Oxford
Mary E. Murphy, Worcester
Oscar H. Peters, Cambridge
John Francis Roche, Pascoag, R. I.
Burton W. Sanderson, Mendon

Undergraduates Attending One or More University Courses

Gardner Cheney Basset
Fred Winfred Chaplin
Charles Percy Christopher
Henry Louis Jackson
Reuben Kaufman
Edmund Randolph Laine, Jr.
Tetsutaro Nakanishi
Laimbeer Peckham
Harold Fisher Pierce
Khalil Abdullah Totah
Arthur Clifford Winslow

Florence Chandler — 938 Main St.
Bursar, and Clerk of the University

Elizabeth Anna Felt — 19 Bowdoin St.
Assistant in the Bursar's office

Mary Evelyn Fitzsimmons, S.B. — 90 Florence St.
Stenographer

Helen Cashman, S.B. — 90 Florence St.
Private Secretary to the President

Instructors	25
Fellows, Scholars and Students	107
Saturday Courses	9
Undergraduates	11
Total	152

ADMINISTRATION

The trustees are the ultimate source of authority in all matters pertaining to the University. They act collectively, through committees, and also through the President of the University.

Duties of the President of the University

The duties of this office were defined by the Trustees, May 23, 1889, as follows:

The President of the University shall consult frequently with the Trustees on all matters that concern the welfare of the University, and attend the meetings of the Board. He shall confer with each instructor concerning the development of his department, determine the duties and authority of each, and preside at the meetings of the Faculty. He shall be the authorized medium of communication between the Board of Trustees and the officers of instruction, individually and collectively, in all matters involving the administration of the University. The enactments of the Board concerning instructors and their work, and all requests, complaints and proposals from the Faculty to the Trustees shall be made known through him. He shall exercise or provide such superintendence over buildings, apparatus, books and other property, as will secure their protection and appropriate use. Expenditures must not be ordered by any instructor of the University without his previous consent or the express authority of the Board.

These duties were more fully defined by By-Laws enacted by the Corporation Sept. 26, 1889. These are as follows:

BY-LAWS

1. The President of the University shall preside on all public academic occasions, shall direct the official correspondence, study the wants and interests of the whole University and exercise a general superintendence over all its concerns. His first care, and that of the authorities of the University, shall be the departments already established, and next those closely related to them; but no other department shall be established until those already introduced have been brought to the highest state of efficiency then possible. All acts, however, which shall involve the expenditure of money in the administration of the University's affairs, shall be subject to the approval of the Board of Trustees or the Finance Committee for the time being.

2. As the efficiency of a University depends chiefly upon the quality of its Faculty, the Board of Trustees will hold the President to a strict but reasonable accountability for the fidelity and ability of each instructor. The President only shall have the power to select and appoint all officers of instruction, subject to the approval of the Board of Trustees. To make wise and well-considered appointments, to maintain harmony within the Faculty, and to increase their efficiency in research and instruction shall be his most important duty. If at any time the President shall be negligent in the discharge of these or other duties, or is from any cause disabled from discharging them, they may be exercised by the Board of Trustees.

3. The President of the University shall be the medium of communication between the Trustees and Instructors, individually and collectively, upon all matters within the field of

action of either body. He shall attend all meetings of the Board of Trustees, of which he shall be notified, and shall participate in their deliberations, but without the power to vote. All complaints and requests from members of one body to the other shall be made through him.

4. The President shall call and preside over all official meetings of the Instructors, and a record of their proceedings shall be kept. These records are in no case to be made known to others than the Trustees. They shall always be in the custody of the President, but may be inspected by the Trustees, or either of them, at any time.

5. The President of the University, in the absence of the Trustees or Finance Committee, shall have the entire direction and control of the persons employed about the University and not engaged in the work of instruction; the duties of all such persons shall be assigned and they shall be appointed or removed by him, subject to the approval of the Finance Committee.

6. No instructor shall order any books or apparatus, or anything connected with the work of instruction (beyond his appropriation), without the approval of the President. No expense for the care of buildings or grounds, nor for alterations or repairs within and upon the same shall be made without the approval of the Board of Trustees or the Finance Committee, such alterations or repairs in no case to exceed the appropriations made for that purpose. If the Trustees, or Finance Committee,or any person, shall make contracts in behalf of the University without authority, the officer or person making such contract shall become individually responsible therefor.

7. The officers of instruction shall be appointed for a term of from one to five years. At the end of this period the work of each instructor will be subjected to a careful scrutiny upon the results of which his reappointment shall depend, always provided, however, that any Instructor will be liable to be dis-

charged at any time for incapacity, neglect of duty or for such other cause as shall seem good to the Trustees.

8. Each Instructor shall give stated lectures to however few. He shall actively and zealously strive to maintain the highest possible standard, shall work in a spirit of hearty sympathy and coöperation, and shall encourage research by precept and, if possible, by example.

9. The foregoing By-Laws are intended to embody the provisions contained in a vote passed by the corporation on the twenty-third day of May, A.D. 1889, upon the motion of Judge Devens. (See above.) If at any time hereafter any discrepancy shall be found to exist between the two, said By-Laws shall be so far modified as to conform to the provisions of said vote.

10. No instructor shall engage in any outside professional or technical pursuit without the approval of the Board, the Finance Committee, or the President.

11. These By-Laws, or any one of them, may be changed, amended, or repealed by a vote of three-fourths at least of the Trustees at any meeting of their Board duly called, notified, and held for that purpose.

GENERAL STATEMENTS

The University now consists of nine departments, in which all its work and that of Instructors, Fellows and Scholars, is grouped.

These departments are as follows:

I. Mathematics
II. Physics
III. Chemistry
IV. Biology
V. Anthropology
VI. Psychology
VII. Pedagogy
VIII. Economics and Sociology
IX. History

The Faculty

The Faculty elect Fellows and take action upon general requirements for the Doctor's and Master's degrees and other promotions, act and advise upon whatever may be officially submitted to them by the Board or by the President, and consider all matters not otherwise provided for and in which all departments of the University are alike interested.

Admission

Only graduate students or those of equivalent attainments are admitted to full membership in the University, except in rare and special cases.

At present no entrance examinations are required; but by testimonials, diplomas, personal interviews, or written specimens of work, the authorities must be satisfied that the applicants have scholarship enough to work to advantage, and zeal and ability enough to devote themselves to their chosen field. The methods of the University are too costly, and its energy and funds too precious, to be spent upon those who are not well trained, promising and in earnest.

It is highly desirable that candidates entering any of the nine departments shall have, besides a knowledge of the other subjects commonly taught in colleges, a reading knowledge of French and German.

For the select students who are received, it is the purpose of the University to open all its privileges and to supply every incentive possible in the way of books, facilities, and, above all, direct personal stimulus. The chief as well as the best work of this University is individual and involves daily suggestion, encouragement and direction. The limited number of students permits more or less personal instruction in each case.

Classes of Appointees

No clearly marked line exists between students and instructors. Fellows who have attained some degree of mastery in a special line of work sometimes give brief special courses, which may be attended by professors.

This is a stimulus to the student, and both tests and exhibits power in teaching.

I. DOCENTS

The highest residential appointment not involving membership in the Faculty is that of Docent. These positions are designed for men of marked gifts and attainments who have at least attained the doctorate and wish to engage in research, teaching, or both.

Class A. Free Docents

Each docent of this class will be expected to deliver a limited number of lectures on some topic within his department. In so doing, he shall be entirely independent of other instructors both in his choice of special topic and his manner of treating it, and responsible only to the President of the University, by whom he shall be appointed after consultation with the head of the department. The free docent shall have command of the resources of the department in the way of books, apparatus, etc., so far as this does not interfere with its regular work. By establishing free docents, the Faculty desires not only to maintain and guarantee the fullest academic freedom, but to expose itself to all the stimulus that can come by the rivalry of younger or outside men, and to introduce new topics and new departures in old ones.

Class B. University Docents

A University docent shall engage in research and may collaborate with the head of the department or other

member of the Faculty and supplement his work. He shall be appointed by the head of the department with the approval of the President.

Habilitation of Docents

A docent of either class may prepare and read in public an habilitation address representing original work after a term of service of a length and under conditions to be determined by the Faculty for each individual case. Upon doing this, he may be formally presented with a certificate or diploma granting him the *venia docendi* or licentiate, which shall not be a title or degree, but shall attest his fitness as scholar or investigator for an academic position and shall be regarded by the University as a brevet collegiate professorship. The fee for such a certificate shall be $25, which the Faculty shall have power to remit. The compensation of a docent of either class, if any, shall be determined by the President, and the fees to be paid him by students, if any, shall be determined by the Bursar.

It is believed that the difficulties of college authorities in selecting suitable professors may be somewhat diminished by the existence of such a select body of scholars of guaranteed scientific training, ability, and approved power to teach, and that this new grade may aid in raising the standard of academic scholarship.

II. QUIZ MASTERS

Each member of the University Faculty may, with the approval of the President, appoint one or more quiz masters who with the aid of his course, lecture notes,

or both, shall conduct review classes upon his lectures and who may hold preliminary tests, but who shall not lecture or give instruction save as review. These positions shall be regarded as honorary and as a privilege of more advanced students in perfecting their own knowledge and acquiring practice in instruction.

III. NON-RESIDENT LECTURERS

The representatives of each department may, with the approval of the President, bring eminent experts for exchange or other lectures of a special nature at any time during the academic year. They may also in return, with the approval of the President, give similar brief courses in other institutions, provided this does not interfere with their full efficiency for the work of this University.

IV. HONORARY FELLOWS

Those who have already advanced to the Doctor's degree may be appointed Honorary Fellows and given the privileges of the University, including those of the Library. In past years many who have already taken this degree, either in this country or abroad, and who are awaiting academic appointment, have found these positions both helpful for their own further research and development and also advantageous for obtaining the collegiate and university appointments that they seek.

V. CANDIDATES FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

Candidates for the Doctor's degree must have previously taken the Degree of Bachelor of Arts or have had

a substantial equivalent for the training implied by that degree.

At least one year, but in most cases three years, of graduate work are necessary for this degree. Examinations for it, however, may be taken at any time during the academic year when, in the judgment of the University authorities, the candidate is prepared, provided the requirement of one year's residence has been absolved.

For this degree one requirement is a dissertation upon an approved subject, to which it must be an original contribution of value. To this capital importance is attached. It must be reported on in writing by the chief instructor before the examination, printed at the expense of the candidate, and at least one hundred copies given to the University. However, in case of a dissertation of unusual length, or containing expensive plates, the Faculty shall have power, at the request of the candidate, to reduce this number of presentation copies to fifty.

Such formal or informal tests as the Faculty may determine shall mark the acceptance of each student or Fellow as a candidate for this degree. One object of this preliminary test shall be to insure a good reading knowledge of French and German. Such formal candidature shall precede the examination itself by a period prescribed in the special rules below.

The fee for the Doctor's degree is $25, payable before the examination. The presentation copies of the dissertation must be in the hands of the Librarian before the diploma is delivered. In exceptional cases, and by special action of the Faculty, the act of promotion may precede the presentation of the printed copies of the dissertation.

An oral, but no written, examination is required upon at least one minor subject in addition to the major before an examining jury composed of at least four members, including the head of the department and the President of the University, who is authorized to invite any person from within or without the University to be present and to ask questions. The jury shall report the results of the examination to the Faculty, who will recommend satisfactory candidates for the degree.

For the bestowal of this degree, the approbation of the Board of Trustees must in each case be obtained by their signature upon the diploma. They desire that the standard of requirements for it be kept the highest practicable, that it be reserved for those of superior ability and attainment only, and that its value be never suffered to depreciate.

It is to the needs of candidates for this degree that the lectures, seminaries, laboratories, collections of books, apparatus, etc., are especially shaped, and no pains will be spared to afford them every needed stimulus and opportunity. It is for them that the Fellowships and Scholarships are primarily intended, although any of these honors may be awarded to others.

On November 14th, 1900, the following vote was passed by the Board of Trustees:

That the University will admit candidates for the degree of Doctor of Philosophy and will confer that degree without regard to sex.

Special Rules concerning the Doctor's Degree

I. *Residence.* No candidate shall receive the degree of Doctor of Philosophy without at least one academic year's previous residence.

II. *Candidature for the Doctor's Degree.* Every applicant for the Doctor's degree shall fill out, before October fifteenth, the regular application blank provided at the office. This schedule shall be submitted to the head of the department. Before affixing his signature he shall satisfy himself, in such manner as he may desire, as to the fitness of the applicant.

III. When countersigned, this schedule shall be filed with the President, and the applicant will be examined in French and German by the annual committee for that purpose.

IV. In case of a favorable report by this committee, the applicant shall be a regular candidate for the degree.

V. Candidates complying with all preliminary conditions, including the examinations in French and German, before November first will be allowed to proceed to the doctor's examination at any time between May fifteenth following and the end of the academic year.

VI. *The Doctor's Dissertation.* The dissertation must be presented to the instructor under whose direction it is written, and reported upon by him before the doctor's examination. In every case the dissertation shall be laid before the jury of examination, at the time of examination, in form suitable for publication. This provision shall not, however, preclude the making of such minor changes later as the chief instructor may approve.

VII. The dissertation shall be printed at the expense of the candidate and the required copies deposited with the Librarian within one calendar year after the first of October following the examination. The candidate alone will be held responsible for the fulfilment of these conditions.

VIII. The favorable report of the chief instructor, filed in writing with the Clerk of the University, shall be a sufficient imprimatur or authorization for printing as a dissertation. The printed copies shall bear upon the cover and title page the statement of approval in the following words, over the signature of the chief instructor:

> A Dissertation submitted to the Faculty of Clark University, Worcester, Mass., in partial fulfilment of the requirements for the degree of Doctor of Philosophy, and accepted on the recommendation of
>
> (NAME OF CHIEF INSTRUCTOR)

IX. *Examinations for the Doctor's Degree.* The examinations for the doctor's degree may be held at any time during the academic year, provided that at least one academic year has elapsed since the completion of the preliminaries of candidature, except in the case of fulfilment of these conditions between the beginning of any academic year and November first of that year, to which case Rule V applies. The examinations shall be held at such hours and places as the President may appoint.

X. Examinations may also be held during the regular vacations of the University, but for these an additional fee of five dollars to each examiner and the reasonable travelling expenses of any examiners who are out of town, all payable in advance, will be required.

VI. CANDIDATES FOR THE DEGREE OF MASTER OF ARTS

This degree is conferred upon candidates who comply with the following requirements:

1. The candidate shall have previously taken the degree of Bachelor of Arts, or have had a substantial

equivalent for the training implied by that degree, to be determined by special vote of the Faculty; but such degree or training must involve a good preparation for the work proposed for the Master's degree, in order that it may be accepted.

2. The candidate must devote a full academic year to post-graduate work in this University after receiving the Bachelor's degree or the training accepted as its equivalent. This work shall be mainly in one department, but the candidate may do also such other work as shall be advised by the head of his principal department, —whose approval of the whole course shall be necessary. In particular cases, the candidate may be allowed, by special vote of the Faculty, to divide his work between two years; but the aggregate must, in all cases, amount to a full year's work, at least.

3. The candidate must satisfy the representatives of his principal department that he has done his work faithfully and has mastered the subjects involved, by such written and oral examinations and other tests as the department may require. The head of the department shall make a written report to the Faculty of the grounds on which the candidate is recommended, specifying the amount and character of his work. and this report shall be filed in the office.

4. The candidate must present a thesis or written report on some topic included in his course or closely related to it, that shall receive the approval of the representatives of his principal department, be accepted by the Faculty, and filed in the office.

5. Every candidate recommended for the Master's degree shall pay a fee of ten dollars.

6. The Master's degree will be conferred at the annual commencement in June of any year on those candidates only who shall have made written application to be considered as such on or before January 15th preceding and shall have fulfilled all the conditions here specified at least one week before Commencement, at which time the academic year shall be regarded as ending for the purposes of section 2.

VII. SPECIAL STUDENTS NOT CANDIDATES FOR A DEGREE

Any one desiring to undertake a special and approved line of research, and whose attainments are such as to satisfy the requirements of the University, may also be received. This class includes persons who may desire to devote themselves exclusively to one or more of the special branches—mathematics, physics, chemistry, biology, anthropology, psychology, pedagogy, economics and sociology, or history,—but who do not care to matriculate or become candidates for a degree.

These students, provided they satisfy the heads of the departments of their training and competency in one subject, in which they must be advanced (although they may be less so, or even beginners, in other subjects), may be allowed entire freedom in their choice and combination of studies, and as special students may enjoy all the privileges of the University.

These students may, with the approval of the President, be received for less than an entire year.

VIII. PRELIMINARY CANDIDATES

Non-university students of less special or less advanced standing than the above classes, who contemplate be-

coming candidates for some higher degree, may also be received.

Students of this class must satisfy the authorities of the University of their attainments and that they contemplate advancing to a degree higher than that of A.B. The privileges and status of these students will be more fully defined later. They may, in exceptional cases, be elected to Scholarships.

Fellowships and Scholarships

From the George F. Hoar Fund of $100,000 provided by the generosity of Andrew Carnegie, the sum of $3,000 is now available for Junior and Senior Fellowships in the University. While the sums attached to these appointments are not fixed, a Senior Fellow may receive $200 together with the remission of fees; which makes the value of the appointment $300. A Junior Fellow may receive $100 with remission of fees, which makes the value of the appointment $200. Besides these, other appointments of Senior and Junior University Scholarships, with remission of fees, are made.

A citizen's fund

A citizen of Worcester has given a fund of $5,000, the income of which is to be used for the aid of "some one or more worthy native born citizens of the city of Worcester who may desire to avail themselves of the advantages of the institution."

THE FIELD FUND

Mrs. Eliza W. Field has also given $500 to be called the "John White Field Fund," the income of which is "to provide for the minor needs of a Scholar or Fellow."

The following regulations apply to the award of the income of the Field Fund:

1. Regard is had to the intellectual ability of the candidate as well as to need of pecuniary assistance.

2. Only candidates who have spent three months at the University are considered.

3. The head of each department will consider and report to the Faculty desirable cases in his department.

4. Applications are received not later than December 15th, and the awards made as soon as possible after the Christmas recess.

THE ELIZA D. DODGE FUND

Mrs. Dodge has given $1,000 to be known as the "Eliza D. Dodge Fund," the income only to be expended in aid of graduate students of limited means engaged in research work.

PURPOSE AND CONDITIONS OF FELLOWSHIPS AND SCHOLARSHIPS

Fellowships at Clark University are intended for young men and women of promise who desire to pursue post-graduate studies in order to fit themselves for intellectual careers. It is desirable, but not required, that candidates for these positions should intend to proceed to the degree of Doctor of Philosophy or to equivalent attainments. In general, those intending to devote themselves to some

special branch of learning are preferred to those directly fitting themselves for one of the three learned professions, although the latter are not excluded.

No application blanks are provided, but it is desired that the candidate should state fully and in writing his previous course of study and submit testimonials or diplomas, especially such as indicate a decided preference for some particular department. These should be accompanied also, if practicable, by some specimen of the candidate's work. Applications will be considered in May and in October and should be in the hands of the President on or before the first day of either month. In special cases vacancies may be filled by appointments at any time during the year. The names of unsuccessful candidates will not be made public.

Fellows must reside in Worcester during the entire academic year, devote themselves to special studies under the direction of their instructors, and give such evidence of progress or proficiency before the end of the year as the authorities shall require. It is generally expected that they will undertake some work of research during the year. They must coöperate in promoting harmony, order, and all the ends of the University, must not teach elsewhere, and may be reappointed at the end of the year. Being intended primarily as honors, both Fellowships and Scholarships are awarded without reference to pecuniary needs, so that those able and desiring to do so may relinquish the emolument and retain the title of "Scholar" or "Fellow."

The paying fellowships will, for the present, be restricted to the departments of mathematics, physics, chemistry, biology, psychology, pedagogy, anthropology, economics, and history.

Besides field work, excursions to institutions (public and private), coaching and cram classes, clubs, examinations, and other modes by which knowledge now seems best imparted and retained, the following educational methods are prominent:

Lectures. The Trustees desire that each instructor, of however few students, should prepare and deliver regular lecture courses, with diagrams, illustrative apparatus, and reference to standard text-books and the best current literature upon each topic. Advanced students are also encouraged to supplement the work of the professors by giving occasional special lectures and courses. Public lectures will be given from time to time.

Seminaries and Conferences. These are stated meetings for joint systematic work, under the personal direction of the professor, in some special part of his subject. Here students preparing theses and other papers for publication in the journals edited at the University read them in incomplete form for mutual criticism and help. Here, also, the results of individual reading are reported for the benefit of all; views are freely criticised; new inquiries, methods, comparisons, standpoints, etc., suggested. From the mutual stimulus thus given many important works have proceeded and the efficiency of universities has been greatly increased.

Laboratory Work. For beginners this has been from the first the best of all forms of apprenticeship, bringing student and professor to a closer and mutually stimulating relation. Here the manipulation of apparatus is learned, processes are criticised, results obtained

by other investigators are tested, and methods discussed and perfected, with a view to developing that independence in research which is the consummation of scientific culture.

Notices

The charge for tuition, giving all the privileges of the University, but not covering the laboratory fees, is $100 per annum.

Board and lodging can be obtained near the University at very moderate rates.

Intending students will be given information, so far as possible, upon any of these or other points, in advance of official announcement, upon addressing the Clerk of the University, Miss Florence Chandler, Worcester, Mass.

All members of the University are expected to be present at the opening of each term and to continue in attendance to its close.

The following are the statements and announcements of the departments for the academic year, 1911-1912.

I. MATHEMATICS

Programme for 1911-1912

Instruction in Mathematics

The chief aim of the department is to make independent investigators of such students as have mathematical taste and ability; these naturally look forward to careers as teachers of the higher mathematics in colleges and universities, and we believe that the course of training best adapted to the development of investigators is also that which is most suitable for all who would be efficient college professors, even if they are not ambitious to engage in research. The first essential of success in either of these lines is the habit of mathematical thought, and the direct object of our instruction is the acquisition of this habit by each of our students. With this end in view, we expect every student to make himself familiar with the general methods and most salient results of a large number of different branches of mathematics, conversant with the detailed results and the literature of a few branches, and thorough master of at least one special topic to the extent of making a real contribution to our knowledge of that subject.

In accordance with these principles, the instruction is given by means of introductory, advanced, and special courses of lectures, seminaries, and personal guidance in reading and investigation.

The introductory courses (mostly given in alternate years) treat the following subjects:

Analytic Geometry of Conics, Higher Plane Curves, Quadrics, Higher Surfaces, and Twisted Curves; 5 hours a week, through the year.

Differential Equations, and Calculus of Variations; 5 hours a week, through the year.

Theory of Functions of Real and Imaginary Variables, Elliptic Functions, and Definite Integrals; 5 hours a week, through the year.

Theory of Numbers; 2 hours a week, one half-year.

Modern Synthetic Geometry; 2 hours a week, one half-year.

Algebraic Substitutions and their Application to the Theory of Equations; 2 hours a week, one half-year.

Algebraic Invariants; 2 hours a week, one half-year.

Finite Differences; 2 hours a week, one half-year.

It is expected that every student will take each course in the earliest year of his residence in which it is given, unless he has already completed an equivalent course elsewhere. The chief object of these courses is to make the student familiar with the various methods of mathematical research and the concepts of mathematical thought at the present day. Thus, for example, curves and surfaces are treated by modern methods from the beginning, with adequate consideration of the discoveries of the great geometers of recent times. The usual college courses in the theory of algebraic equations, analytic geometry, and the differential and integral calculus furnish all the necessary preparation for these introductory courses, althoughit it is very desirable that the student be acquainted with the properties of determinants and their application to the solution of linear equations, and with the methods of solving differential equations of the simpler types. Deficiencies in these subjects may be made up by attendance on the corresponding courses in the Collegiate Department of the University.

A Seminary will be conducted in connection with the introductory courses, in which the students will be exercised in individual investigation and the oral presentation of results.

The literature of the topics discussed will here receive adequate attention.

Special advanced courses, open to such as have nearly or quite completed the introductory courses, are given annually in subjects varying with the interests of the instructors and the needs of the students.

Each advanced student is placed under the supervision of one of the instructors for guidance in the original investigation of some special topic; the successful issue of this investigation may furnish material for the dissertation required of a candidate for the degree of Doctor of Philosophy.

For the academic year 1911–1912, the following courses are offered:

BY PROFESSOR STORY

Introductory Course:

ANALYTIC GEOMETRY OF HIGHER PLANE CURVES; HIGHER SURFACES, AND TWISTED CURVES; 3 hours a week through the year.

Advanced Courses:

HISTORY OF MATHEMATICS; 2 hours a week, first half-year.

HYPERSPACE AND NON-EUCLIDIAN GEOMETRY; 2 hours a week, through the year.

ALGEBRAIC INVARIANTS; 2 hours a week, second half-year.

SEMINARY FOR ADVANCED STUDENTS; through the year.

BY PROFESSOR TABER

Introductory Course:

DIFFERENTIAL EQUATIONS AND CALCULUS OF VARIATIONS; 5 hours a week, through the year.

Advanced Courses:

TRANSFORMATION GROUPS; 2 hours a week, first half-year.

PICARD-VESSIOT THEORY OF LINEAR DIFFERENTIAL EQUATIONS; 2 hours a week, second half-year.

SEMINARY, through the year.

BY PROFESSOR WEBSTER

[See announcement of Department of Physics, courses 10, 11, 13, 14.]

BY M. DE PEROTT

Introductory Course:

THEORY OF NUMBERS; 2 hours a week, first half-year.

ALGEBRAIC SUBSTITUTIONS; 2 hours a week, second half-year.

BY DR. WILLIAMS

Introductory Course:

CONIC SECTIONS AND QUADRIC SURFACES (Modern methods, homogeneous coördinates, etc.); 2 hours a week, through the year.

During the academic years 1889-1911 advanced and special courses have been given n:i

1. THE HISTORY OF MATHEMATICS among various peoples from the earliest times to A. D. 1650.

2. THEORY OF NUMBERS.

3. LINEAR TRANSFORMATIONS AND ALGEBRAIC INVARIANTS, with applications to algebraic equations and geometry.

4. THEORY OF SUBSTITUTIONS, with applications to algebraic equations.

5. PLANE ANALYTIC GEOMETRY.

6. SOLID ANALYTIC GEOMETRY.

7. HYPERSPACE AND NON-EUCLIDIAN GEOMETRY.

8. ENUMERATIVE GEOMETRY.

9. QUATERNIONS, with applications to geometry and mechanics.

10. MULTIPLE ALGEBRA, including matrices, quaternions, the "Ausdehnungslehre," and extensive algebra in general.

11. MODERN SYNTHETIC GEOMETRY.

12. THEORY OF FUNCTIONS according to Cauchy, Riemann, and Weierstrass, with applications.

13. WEIERSTRASS'S THEORY OF ELLIPTIC FUNCTIONS.

14. ABELIAN FUNCTIONS AND INTEGRALS.

15. NUMERICAL COMPUTATIONS.

16. THEORY OF QUADRATIC FORMS.

17. ANALYSIS SITUS, (the connectedness of surfaces, etc.).

18. SURFACES OF THE THIRD AND FOURTH ORDERS (analytically treated).

19. Plane Curves of the Third and Fourth Orders (analytically treated).

20. Klein's Icosahedron-Theory.

21. Elliptic Modular Functions.

22. Theta-Functions of Three and Four Variables.

23. Riemann's Theory of Hyperelliptic Integrals.

24. Symbolic Logic.

25. Twisted Curves and Developable Surfaces (torses).

26. Rational and Uniform Transformations of Curves and Surfaces.

27. Theory of Functions of a Real Variable.

28. Definite Integrals and Fourier's Series.

29. Ordinary Differential Equations, including differential equations with infinitesimal transformations, general theory of linear differential equations, Gauss', Legendre's, and Bessel's functions.

30. Partial Differential Equations, including Laplace's, Bessel's and Lamé's functions.

31. Finite Differences and Probabilities.

32. Applications of the Infinitesimal Calculus to the Theory of Surfaces.

33. Simultaneous Equations, including Restricted Systems.

34. Theory of Transformation Groups.

35. The Application of Transformation Groups to Differential Equations.

36. Theory of Errors.

The advanced and special courses are not repeated at regular intervals, but properly prepared students will receive the personal assistance of one or other of the instructors in reading any subject not announced for the year in which they desire to take it.

The number and scope of the advanced courses given each year have been, thus far, regulated by the number of students qualified to profit by them and by the individual interests of the instructors; these courses will be increased, both in number and variety, whenever a real demand for such an increase shall make itself apparent. While the present purely scientific character of the University precludes instruction in strictly technical branches, we hope that the time is not far

distant when the demand shall make it advisable, and increased facilities shall make it possible, to announce courses in Descriptive Geometry, Graphical Statics, Mathematical Astronomy, Vital Probabilities, and all the more important applications of mathematics to other sciences and to technical subjects. The applications of mathematics to physics already receive adequate consideration, and the further extension of such applications awaits only a demand for it on the part of students.

Each year seminaries for the training of students in methods of investigation are conducted by the several instructors, and those who have attained the necessary proficiency are personally directed in individual researches, of which the results are published in various mathematical journals.

The degree of Doctor of Philosophy is conferred upon such students as have completed all the introductory courses and a satisfactory number of advanced and special courses, have presented approved memoirs embodying the results of original investigation, and have passed creditable examinations in their principal department of study and in one subordinate department. Mathematical students are generally advised to offer theoretical physics as their subordinate subject, and facilities are given for acquiring the requisite knowledge of this subject during their first and second years at the University. Three years of University work are ordinarily necessary to obtain the degree.

The degree of Master of Arts will be conferred upon students who complete with credit an approved course of one year and present a satisfactory thesis.

Every facility for the study of special branches will be given to properly prepared students who are not candidates for the doctor's degree, and to those who, having already taken the degree (here or elsewhere), wish to continue mathematical study or investigation.

The Library is provided with the more important text-books, treatises, and memoirs on the various branches of mathematics, as well as the principal journals and transactions of learned societies that are devoted to any considerable extent to mathematics. Among the periodicals are the following:

Acta mathematica. Stockholm, Berlin and Paris, 1882 to date. Complete.

American association for the advancement of science. Proceedings, 1848 to date. Complete.

American journal of mathematics. Baltimore, 1878 to date. Complete.

American Mathematical Society.

Bulletin. 1894 to date. Complete.

Transactions. 1900 to date. Complete.

Amsterdam. Koninklijke akademie van wetenschappen. Verhandelingen, 1854 to date. Complete.

Annali di matematica, pura ed applicata. Milano, 1889 to date.

Annals of mathematics. 1884 to date. Complete.

Archiv der mathematik und physik. 1901 to date.

Berlin. Königlich-preussische akademie der wissenschaften. Mathematische und naturwissenschaftliche mittheilungen aus den sitzungsberichten. 1882-97. Complete.

Berliner mathematische gesellschaft. Sitzungsberichte. 1902 to date. Complete.

Bibliotheca mathematica. Stockholm, Berlin and Paris, 1884 to date. Complete.

Bologna, Istituto di. Reale academia delle scienze.

Commentarii. 1731-1791. Complete.

Novi commentarii. 1834-1849.

Memorie fis. e mat. 1806-1810.

Memorie. 1850 to date. Complete.

Boston. American academy of arts and sciences. Proceedings, 1870 to date. Complete.

British association for the advancement of science. Reports. 1831 to date. Complete.

Brussels. Académie royale des sciences des lettres et des beaux-arts de Belgique.

Bulletins. Ser. 3. 1889 to date.

Mémoires couronnés et mémories des savants étrangers. 1889-90.

Bulletin des sciences, mathématiques et astronomiques. Paris, 1870 to date. Complete.

Cambridge philosophical society.

Proceedings. 1843 to date. Complete.

Transactions. 1822 to date. Complete.

Colorado, University of. Studies. 1902 to date. Complete.

Deutsche mathematiker-vereinigung. Jahresbericht. Leipzig, 1890, to date. Complete.

Edinburgh philosophical journal. 1819-1826.

Edinburgh. Royal Society. Transactions. 1873 to date. Complete.

Fortschritte der mathematik, Jahrbuch über die. Berlin, 1868 to date. Complete.

France, Société mathématique de. Bulletin. Paris, 1873 to date. Complete.

Göttingen. Königliche gesellschaft der wissenschaften. Nachrichten von der k. gesellsschaft der wissenschaften und der Georg-Augusts-universität. 1853 to date.

Haarlem. Hollandsche maatschappij der wetenschappen. Archives néerlandaises des sciences exactes et naturelles. 1866 to date. Complete.

International catalogue of scientific literature. 1902 to date. Complete.

Internationale mathematiker-congresse. Verhandlungen. 1897 to date. Complete.

Journal de mathématiques pures et appliquées. Paris, 1836 to date. Complete.

Journal für die reine und angewandte mathematik. Berlin, 1826 to date. Complete.

Leipzig. Königlich-sächsische gesellschaft der wissenchaften.

Berichte über die verhandlungen der mathematisch-physischen classe. 1849 to date. Complete.

Abhandlungen der mathematisch-physischen classe. 1852 to date. Complete.

Liège. Société royale des sciences. Mémoires. 1843 to date. Complete.

London mathematical society. Proceedings. 1865 to date. Complete.

London. Royal society.

Proceedings. 1800 to date. Complete.

Philosophical transactions. 1665 to date. Complete.

Mathematische annalen. Leipzig, 1869 to date. Complete.

Messenger of mathematics. Oxford, Cambridge and Dublin, 1862 to date. Complete.

Milan. Reale istituto lombardo di scienze e lettere.

Classe di scienze mathematiche e naturali. Rendiconti. 1864-67. Complete.

Rendiconti. 1868 to date. Complete.

Memorie. 1843 to date. Complete.

Monatshefte für mathematik u. physik. Wien, 1908.

New York mathematical society. Bulletin. 1891-94. Complete.

Nouvelles annales de mathématiques. Paris, 1842 to date. Complete.

Paris. Institut de France. Académie des sciences. Comptes rendus hebdomadaires des séances. 1835 to date. Complete.

Paris. Annales scientifiques de l'école normale supérieure. 1864 to date. Complete.

Paris. École polytechnique. Journal. 1794 to date. Complete.

Philosophical magazine. London, Edinburgh and Dublin, 1798 to date. Complete.

Quarterly journal of pure and applied mathematics. London, 1857 to date. Complete.

Revue semestrielle des publications mathématiques, rédigée sous les auspices de la société mathématique d'Amsterdam. 1893 to date. Complete.

Rome. Reale accademia dei lincei. Atti. Rendiconti.

Tokyo. Mathematico-physical society. Proceedings (Tôkyô sûgaku-buturigakkwai kizi) 2d Ser. 1901 to date. Complete.

Vienna. Kaiserliche akademie der wissenschaften. Sitzungsberichte der mathematisch-naturwissenschaftlichen classe. 1848 to date. Complete.

Zeitschrift für mathematik und physik. Leipzig, 1856 to date. Complete.

Zeitschrift für mathematische und naturwissenschaftliche unterricht. 1903 to date.

The department possesses a set of Brill's admirable models and Björling's thread models of developable surfaces.

The department possesses also:

An Amsler Planimeter (with revolving table) and a Thomas Arithmometer.

II PHYSICS

Professor Webster will deliver the following lectures. In order to meet the convenience of students, and to prevent the necessity of waiting for the logical beginning of the cycle, the regular courses are repeated with a cycle of two years. These embrace the subjects that are indispensable, and the pursuit of them will fit the student to read and study any memoirs on mathematical physics. The courses are so arranged that, although they follow in order, it is possible for a student to begin in either year of the cycle. The regular courses are not marked with a star, and constitute a course of from five to seven hours weekly. The starred courses are delivered at irregular intervals, according to the demands or the presence of students of sufficient advancement.

LECTURES

1. Dynamics. General Principles, Equations of Lagrange and Hamilton, Methods of Hamilton and Jacobi, Systems of Particles, Rigid Bodies.

This course is fundamental for the pursuit of all the others, and includes a detailed account of the principle of Least Action and the differential equations of Lagrange, preparatory to their application to other parts of mathematical physics such as optics and electricity.

2. Newtonian and Logarithmic Potential Functions, Attraction of Ellipsoids.

This course is a necessary preliminary to the study of electricity and magnetism, of hydrodynamics, and of the figure of the earth.

3. Elasticity, Hydrodynamics, Wave and Vortex Motion, Dynamical Basis of Sound and Light.

This course is the basis of applications of the theory of wave motion to sound, light, electro-magnetism, and earthquake waves, and to the study of meteorology.

3a. * Dynamics of Cyclic and Oscillatory Systems, with Applications to the Theory of Electricity, Sound and Light.

The substance of the preceding courses is contained in Professor Webster's Treatise on Dynamics, B. G. Teubner, Leipzig.

3b. * The Theory of Resonance with Applications to the Measurement of Sound and to Wireless Telegraphy.

This course takes up Professor Webster's original researches in acoustics, and also shows how the methods there employed bear on the fundamental electrical phenomena involved in wireless telegraphy.

4. Electricity and Magnetism. The Classical Theories and the Theory of Maxwell, with an account of the principal methods for the solution of problems and applications to absolute measurements.

The substance of this course is found in Professor Webster's Mathematical Treatise on the Theory of Electricity and Magnetism, London, Macmillan & Co.

4a. * Recent Developments in Electrical Theory, including the Theory of Lorentz.

The application to the theory of Electrons and to the optics of bodies in motion.

5. The Theory of Light. Propagation of Light, Diffraction, Reflection and Refraction, Dispersion, Double Refraction, Polarization, Metallic Reflection, Magneto-optics.

5a. * Comparison of Theories of the Ether.

Critical and historical examination of the various mechanical explanations of the luminiferous ether, including those of Green, McCullagh, Kelvin, Maxwell, Sommerfeld and Larmor.

5b. * Geometrical Optics. Properties of Systems of Rays, and their Various Aberrations. Hamilton's Characteristic Function or Eikonal. Applications to Optical Instruments.

6. Thermodynamics. Thermo- and Electro-Chemistry.

The establishment of the two laws of Thermodynamics, and their application, by means of the methods of Gibbs and Helmholtz, to the examination of physical and chemical phenomena. Application to heat-engines, including steam, gas, and oil engines, the flow of gases and vapors, and the steam turbine. The conditions of chemical equilibrium, phenomena of electrolysis, osmotic pressure, and capillarity.

7. The Kinetic Theory of Gases. The Maxwell-Boltzmann Theorem and the Elements of Statistical Mechanics.

8. * The Theory of Radiation and of a Black Body.

The relations obtained from the laws of Kirchhoff, Stefan, Wien, and Planck, by the recent application of Thermodynamics.

9. * The Phenomena of Conduction of Electricity in Gases, and of Radioactivity, and their Bearing on the Structure of the Atom.

10. The Partial Differential Equations of Mathematical Physics.

Laplace's Equation, Equation of Thermal and Electrical Conduction, Equation of Wave-motion, Helmholtz's Equation, Beltrami-Lorentz Equation, Telegrapher's Equation, and their special cases; methods of Cauchy, Green and Riemann; Normal functions, Developments in Series, Fourier's Series, Legendre's, Laplace's, Bessel's and Lamé's functions.

This course is one of the most important for the physicist, and treats a great variety of subjects from the most varied fields, grouping them all into a connected system, and embracing all the methods of theoretical physics.

11. * The Elements of Integral Equations, and their application to Mathematical Physics.

12. * Selected Chapters in the Application of Theoretical Physics to Cosmical Phenomena. including Problems in Geodesy, the Tides, Meteorology, Seismology, and Terrestrial Magnetism.

13. * Linear Differential Equations.

The applications of the theory of functions to the linear differential equations of the second order which arise in mathematical physics.

14. * Orthogonal Surfaces and Curvilinear Coordinates and their Applications.

The courses for 1911-12 will be 5, 5a, 6, 7, 8, 10. During the past year 1, 2, 3, 3*b*, 4, 12, have been given.

Course 2 has this year been given by Dr. Hubbard, while Dr. T. L. Porter has at various times given part of the lectures in courses 1 and 3.

In addition to the above formal courses there is held a weekly Colloquium, or meeting for the informal discussion of subjects not treated in the lectures, and for the presentation by the students of reports on important articles appearing in the journals. A part of the work of the colloquium consists in the systematic presentation of certain classical researches, more or less connected with the lectures, in preparing which the students make use of the original sources of information, thus gaining much acquaint-

ance with the methods of the masters in research. The work of the colloquium has an excellent effect in training students to present their ideas in a systematic manner before an auditory.

The facilities without which no graduate department of research in pure and applied physics can be complete are comprised under three heads: first, a systematic course of lectures in theoretical or mathematical physics; second, a laboratory with a sufficient number of rooms for individual work and with a sufficient equipment of apparatus and an instrument shop for the speedy production of whatever may be necessary for the research in hand; third, a library containing the classic works on physics, with full sets of journals by which the history of progress, past and present, may be studied, and kept up to date by the continual purchase of the latest works. In all these directions the facilities offered by this department invite attention.

Among the various lines of investigation now attracting the attention of the physicists the following are preeminent in importance. First, the interrelations between the luminiferous ether and ordinary matter, and the modifications necessary to be made in Maxwell's theory in order to explain the known optical and electrical phenomena of bodies in motion, and that aspect of the theory which deals with the properties of the small electric bodies known as electrons. This portion of mathematical physics is extremely new, and has hardly begun to appear in university courses in this country. Second, the structure of the atoms of matter, to which the subjects of spectroscopy and the new and fascinating field of radio-activity give the most promising clew. Third, the thermodynamics of radiation in general, which is most intimately connected with the first, and about which a similar remark may be made as to the lack of instruction.

Of branches of applied physics now awaiting the attention of the mathematical physicist may be mentioned meteorology,

seismology, and geophysics in general, in all of which the accumulation of experimental data is ahead of the development of theory, to such an extent in meteorology that Professor Arthur Schuster has said that it would be advisable to suspend all meteorological observations for the next ten years, until the theory should have in some degree caught up with the mass of information already accumulated. The theory of meteorology depends on complicated applications of hydrodynamics and thermodynamics; so as to make great demands upon the mathematical physicist, but the field is a rich one to him possessed of the skill to cultivate it. The study of earthquake phenomena is one that is now becoming of great importance in this country, while the investigation of terrestrial magnetism has lately made great advances.

It is almost obvious to the trained investigator that no one can expect to become a physicist of the first rank without a thorough training in mathematical physics, as without that the results of experiment will never be collected into a coherent system worthy the name of an exact science. Furthermore all mathematical physics must rest upon mechanics, the principles of which are of an importance transcending that of any other branch of natural science. It is for this reason that the courses in physics in this department begin with mechanics, and are developed progressively in a systematic manner. They have the advantage of having been deliberately planned for the needs of students of pure physics, as experience has shown them to be prepared by the various colleges, and of being all delivered by the same person, so that logical consistency and continuity of method are assured. The waste of time often incurred by repetitions of the same subject and of changes of notation by various instructors is thus totally avoided. Attention is called to the fact that no branch of physics is left unprovided for in the course of lectures.

The aim of the department is to insure in its students some acquaintance with all the various fields of experimental physics, to develop in them the power of exact measurement, to accustom them to exact reasoning from experiment to theory, and to encourage original research conducted on a sound basis. To this end students will be put to work in the laboratory upon experiments of sufficient difficulty to give them skill in measurements of precision, and to enable them to become familiar with the precautions and corrections necessary to be employed in exact work. After a sufficient amount of experience has been gained, and the student has shown himself to be possessed of sufficient originality to warrant independent investigation, he will be encouraged to take up for himself an original research in the hope of making a personal contribution to science. In this research he will have at all times the benefit of the direction and advice of the professor.

It should be urged upon intending students to prepare themselves, not only in ordinary laboratory measurements, but also in mathematics, the lack of proper mathematical preparation being a serious drawback to the appreciation of the lectures. In particular may be recommended for study not merely those portions of the calculus which deal with the working out of many indefinite integrals, etc., but the theoretical portions which deal with the ideas of partial derivatives, definite integrals, and their practical manipulation, together with enough analytic geometry to involye the properties of lines and *surfaces* of the second order, and a fair amount of the elements of determinants. As suitable textbooks for preparation may be recommended to the student Lamb's, Osgood's or Gibson's Calculus, C. Smith's Analytical Geometries, and Muir's or Hanus's Determinants. Appell, *Elemênts de l'analyse mathématique* may be very strongly recommended to the intending student for study before and during his course at the University.

It cannot be too strongly urged that the student should, from the beginning, be able to read French and German with ease and to make use of works in them.

REQUIREMENTS FOR THE DOCTOR'S DEGREE

1. The ability to read at sight specimens of scientific French and German, tested before the first of November preceding the doctor's examination by a committee of two members of the Faculty.

2. The successful passing of an examination upon the general subject of Experimental Physics[1] and upon the subjects named above in the regular course in Theoretical Physics, as a major requirement, together with an examination in one minor subject, *to be determined in each particular case by the head of the Physical Department.* This subject will be Mathematics or Chemistry.

3. The presentation of a satisfactory dissertation, involving a substantial amount of original work, and forming a contribution of value to pure science. The presentation of the dissertation is a prequisite to examination. The time of residence necessary for the proper fulfilment of the above requirements will generally be at least three years, of which at least one will be very largely devoted to work on the dissertation. Students will not be encouraged to enter upon the work of a dissertation until they have acquired sufficient experience to enable them to specialize with advantage.

The aim of the department is to produce physicists rather than electricians, acousticians, opticians, engineers, or narrow specialists of any sort, for although in the nature of things one will be obliged to know more of one subject than of others, yet it seems evident that no thorough knowledge of any branch can be gained without a comprehensive view over the whole subject. Without this the specialist, or the experimentalist lacking a knowledge of mathematics, will continually be falling into pitfalls which the more wary avoid. Furthermore it can be but a detriment to science to encourage research in new fields by immature and ill-prepared minds and hands.

The following statement is here inserted for the benefit of students of mathematics.

---

[1] Every student is recommended to provide himself with Winkelmann's *Handbuch der Physik* as a work for continual reference.

The minor in Mathematical Physics consists of the subject-matter of courses 1, 2, 3, and 10, which are intended to constitute the equivalent of five hours a week for one year. Course 10 is given in alternate years to the other courses. The subject-matter of the course is contained in Dr. Webster's treatise on *Dynamics* and Riemann-Weber's *Partielle Differentialgleichungen.*

THE LABORATORY

The laboratory occupies three floors of one wing of a large well lighted building free from disturbances, and admirably adapted to the purposes of a physical laboratory. On the ground floor is a room extending across the end of the building forty-five feet long by twenty-two feet wide, with windows on three sides, above which are three similar rooms. A lift running from the bottom to the top floor affords means of transporting apparatus, while its shaft furnishes space for manometer or barometer tubes. In the lower room are four piers with heavy stone tops, and two others below the floor on which can be placed heavy tables.

Also on the ground floor is a large dark room, partially below ground, in which the temperature is tolerably constant, containing a very large and heavy pier. The engine and storage-battery room contains a kerosene engine and dynamo on the same foundation and sixty storage cells of ten amperes capacity, constituting the power-supply. The engine may be started at a few moments notice, even at night. The storage cells are conveniently arranged so that each one is accessible from each side, from above and below, and the ventilation is excellent, while the room is as light and clean as the work-rooms. Distributing switchboards allow the current from the dynamo or any section of the battery to be supplied to any of the rooms. On the same floor are three rooms constituting the workshop, one of the most important parts of

a research department of physics. The first room is devoted to wood-working and pattern-making, and accommodates also a bench for soldering. The next room contains the machinist's bench, two engine-lathes and planer, and the third room a Rivet precision bench-lathe, jeweller's lathe and drill-press. There is no countershafting in the building, each tool being driven by a separate electric motor, while the capacity of the battery is such that for ordinary purposes it is not necessary to drive the engine for the shop alone, so that perfect quiet and steadiness are ensured. In the shop are executed all repairs and alterations of apparatus, and the new apparatus requiring continual experiment is constructed. Most of the principal pieces of apparatus belonging to this department have been thus constructed. In this manner, by having a mechanic always present, an extremely great economy in time and money is effected, and vexatious delays, which would otherwise completely arrest the progress of the work, are avoided. Facilities and encouragement are given to the students to construct apparatus for themselves.

On the main floor are the lecture room, the director's office, the large room used as the director's private laboratory and apparatus room, and three other convenient rooms for research. Two of these are arranged so that they may be darkened for photography, and are also fitted with chemical hoods. The large room on the top floor is devoted to the Rowland twenty-foot diffraction grating, and has a photographic dark room attached. There has been recently constructed a storage battery of two thousand small cells for researches requiring a constant source of high potential. This battery is conveniently housed next to the grating room. Every room in the laboratory contains sinks, gas and electric light connections, and several circuits connecting with the switchboard in the battery-room.

The laboratory is will equipped with apparatus for research, besides having the facilities above described for the construction of instruments of any sort needed for that purpose. In addition may be mentioned a large collection of diagrams illustrative of mathematical physics, many of them being originals of the figures in Professor Webster's "Electricity and Magnetism" and "Dynamics," and a number of interesting models used in teaching dynamics, thermodynamics, and electricity. Among them are Maxwell's Dynamical Top and a number of other interesting tops, Maxwell's and Rayleigh's induction models, Gibbs's, van der Waals's and other thermodynamical surfaces. This collection of drawings and models can probably not be matched in this country, and is continually being increased.

The laboratory affords so much space that it is rarely necessary to put more than one student in a single room. Every student receives personal attention in the laboratory from the professor whenever he needs it, and is continually in receipt of instruction and suggestion by personal contact, the best form in which information can be imparted. Emphasis should be laid on the advantage to the research student of the contact with a professor who has no other duties or interests than the furtherance of research, in an institution devoted to this as its main object.

THE LIBRARY

In the library Clark University has one of its strongest features. With a large separate building, administered in the most liberal manner with a view to the advantage of the research student, and with ample funds for the purchase of books, its facilities in the Department of Physics can hardly be surpassed. It may be said to contain all of the most important works in many languages, and is continually kept

up to date, any book wanted needing only to be mentioned to be procured. The library is particularly rich in journals, among which are included the transactions of the learned societies of England, France, Germany, Italy, Austria, Holland, and Belgium. Other sets are being continually added. There are few subjects connected with physics which may not be thoroughly studied in this library.

The following works may be mentioned.

Collected Writings of Helmholtz, Hertz, Clausius, Kirchhoff, Kelvin, Lorentz, Gibbs, Green, Huggins, Hopkinson, McCullagh, Joule, Stokes, Maxwell, Rankine, Rayleigh, Regnault, Reynolds, Rowland, Rumford, Tait, Young, Gauss, Fourier, Laplace, Arago, Cauchy, Foucault, Fresnel.

Potential, Electricity and Magnetism. Riemann, Betti, Dirichlet, Korn, Mathieu, Somoff, Kirchhoff, Neumann, Minchin, Routh, Clausius, Duhem, Maxwell, Boltzmann, Drude, Lorentz, Mascart and Joubert, Wallentin, Watson and Burbury, Webster, Gray, Heaviside, Thomson, Poincaré.

Elasticity. Mathieu, Ibbetson, Love, Todhunter and Pearson, Williamson, Clebsch, Neumann, Lamé, Boussinesq, Résal, Poincaré.

Hydrodynamics. Bassett, Lamb, Kirchhoff, Neumann, Poincaré, Wien.

Light. Mascart, Kirchhoff, Helmholtz, Neumann, Volkmann, Drude, Résal, Poincaré, Bassett, Curry, Preston, Wood, Maclaurin, Schuster, Walker.

Heat. Clausius, Helmholtz, Kirchhoff, Planck, Rühlmann, Boltzmann, Voight, Zeuner, Bertrand, Duhem, Poincaré, Preston, Weinstein.

Sound. Rayleigh, Donkin, Barton.

A large number of treatises on mechanics, a set of the Travaux et Mémoires du Comité International de Poids et Mesures, and of the published memoirs of the Physikalisch-technische Reichsanstalt, may also be mentioned.

Among the journals are complete sets of the

Annalen der Physik und Chemie.
Annales de Chimie et de Physique.
Bulletin of the Bureau of Standards.
Comptes Rendus.
Eclairage Electrique.

Journal of Physical Chemistry.
Nature.
Philosophical Magazine.
Philosophical Transactions.
Physical Review.
Physikalische Zeitschrift.
Proceedings of the Royal Society.
Science.
Science Abstracts.
Zeitschrift für Instrumentenkunde.

The library subscribes to the following journals also:

American Journal of Science.
Annalen der Physik.
Beiblätter zu den Annalen der Physik.
Electrical World.
Electrician.
Elektrotechnische Zeitschrift.
Fortschritte der Physik.
Jahrbuch der drahtlosen Telegraphie und Telephonie.
Jahrbuch für Elektronik.
Journal de Physique.
Le Radium.
Il Nuovo Cimento.

III. CHEMISTRY

Within the past few decades chemistry has been gradually passing from the larval state of a descriptive science into a higher state of development, the theoretical stage. This transition has given to the ancient science, not only a new beauty and usefulness, but also an amazing *will to grow.*

Some liken the new chemistry to a tower in the earliest stages of construction, with a host of men swarming on the scaffolding, busily engaged in adding stone after stone to the promising structure.

From the pure science this intense constructive activity has spread, as might be expected, to the applied branches, notably the American chemical industries. Where twenty-five years ago the chemist was employed, and allowed, to do nothing but routine testing, to-day research laboratories are in active operation, whose members are expected to invent, develop, and improve something somewhere in the processes of manufacture. American enterprise has discovered a way toward the highest utilization of the country's wealth in setting trained ingenuity at work in chemical research laboratories.

The equipment of the industrial chemist, as well as of the competent teacher, must consequently consist, not so much in a memorized collection of formulae and processes, or of heterogeneous information in the chemistry of the manufactures, as in a clear critical understanding of the principles of pure chemical science and in some experience in grappling with difficulties. The desire for *such* knowledge, and the

courage and perseverance necessary in attacking problems, are acquired only through research. And hence *a department of chemistry, particularly a graduate department, must be primarily a department of chemical research.*

With this principle in view, the activities of all members of this Department, both instructors and students, are devoted mainly, almost entirely, to research. The number of lectures is reduced to a reasonable minimum. Students take up research from the first day of their residence in the Department, and are directed to devote about one-quarter of their time to all scholastic work combined, and the remaining three-quarters to research. The investigations in which they are expected to engage are, as a rule, entensive in scope and occupy two years at least, in some cases three years or more. This makes it possible for the student to found his Doctor's degree, not on a perfunctory dissertation, but on a study and contribution that will give him scientific confidence for years to come.

Even the lecture courses, instead of forming descriptive presentations of existing chemical knowledge, are conducted, as far as possible, on a research plan. In the first place, the material of the lectures is derived, not from text-books, but from the original literature, and the student is constantly referred to original communications for accessory study. Then, each topic is approached by the lecturer, not as a chapter in a book, but as a problem in nature. The topic is introduced by an estimate of its importance and of its bearing on other problems. This is followed by an account, on the historical plan as far as possible, of the extent to which the problem has been solved, of how this was done, and of how much is not yet solved, with suggestions as to practical methods by which solution might be obtained. It is believed that such *critical mode* of study is the true characteristic of university work; perhaps the only characteristic

that can keep university lectures from forming a continuance of the teaching of the lower schools, which often permanently impairs the student's most precious possession: his inherited creative instinct.

Specialized courses are offered on topics of history of chemistry, chemical dynamics, heterogeneous equilibria, organic synthesis, stereo-chemistry, electro- and thermo-chemistry, applications of thermodynamics to chemistry, etc., and the student is expected to attend them regularly. To aid students not quite prepared for work of this kind, simpler lecture and laboratory courses will be offered in general inorganic chemistry, organic synthesis and analysis, physical chemistry, etc.

Part of the scholastic work of the department consists in Colloquium exercises, students and instructors alike presenting accounts of current chemical research or, at times, delivering formal lectures on classical achievements of the past, or on the life and life-work of celebrated masters of chemical research.

Finally, several times in course of the academic year (but not oftener than once a month) lectures will be delivered here by active chemical investigators from other institutions—lectures dealing generally with the aims and methods of their own investigations. The Department expects much stimulus from such occasional contact with brilliant and hopeful scientific men.

The research work conducted in the Department runs mainly along the following lines: 1. Experimental and theoretical study of the deviations of fact from accepted principles of *general chemistry;* 2. Experimental study of organic substances and reactions from the standpoint of chemical statics and dynamics: *physico-organic chemistry.* Of course, promising investigations may be taken up, from time to time, along other lines as well.

Instead of more or less insignificant pieces of work being "assigned" to students for their first experience in research, they will be made, if they desire it, *collaborators* of their professor in his own investigations (unless, indeed, they bring forward practicable research projects of their own). Nothing could more certainly assure constant and intimate contact between professor and student and the student's really receiving the best that the Department can offer: individual guidance.

REQUIREMENTS FOR THE DOCTOR'S DEGREE

Strictly speaking, there are no formal "requirements" for the Doctor's degree in this Department. The general University Faculty expects in all cases one year's residence. Otherwise the Department is entirely autonomous in its organization of the training for the degree and in its final estimate of the candidate's maturity. *This imposes upon both instructors and students the duty of zealously guarding the honor of the degree and of maintaining in the Department the highest attainable intellectual standard.*

The time necessary to qualify for the degree of Doctor of Philosophy will depend in each case partly upon the ability of the student, but mainly upon the exigencies of his investigation. Three years will not be too long in most cases.

If the student does not possess, at the time of his joining the Department, a good reading knowledge of both German and French and a working knowledge of analytical geometry and the calculus, he ought to acquire such knowledge as early as possible. Experience shows that students learn a considerable amount of mathematics through the special course in chemical mathematics offered here, and also through the courses in physical chemistry. The Colloquium work invariably leads to improvement of the student's knowledge of languages.

The student is advised and expected not to neglect any one of the great branches of modern chemistry by "majoring" in one of them and "merely minoring" in the others. The examinations for the degree will consist, on the one hand, in a series of partial tests distributed throughout the candidate's period of residence and, on the other hand, in a general final examination in the several branches of chemical science, including organic and physical chemistry, and chemical statics and dynamics; also in one minor subject *to be determined in each case by the Head of the Chemical Department*.

But the real basis upon which the degree will be conferred will be a dissertation forming, in the opinion of the Head of the Department, a genuine contribution, either purely theoretical or experimental, to chemical science.

If a candidate shall have shown in his research signs of true originality of thought, the Doctor's degree will be conferred upon him *cum laude*.

THE MASTER'S DEGREE

The University does not require an original scientific contribution in connection with the Master's degree. In this Department an applicant is, accordingly, offered free choice between founding his degree on research or on purely scholastic work. It is a pleasure to record that as yet applicants have invariably chosen the former, in spite of being warned that research is uncertain of outcome and more difficult, and might prolong to two years the time necessary for the attainment of the degree.

In the scholastic exercises no qualitative distinction is made between work for the Master's and that for the Doctor's degree in chemistry. The former degree is considered a stepping-stone to the latter.

COURSES GIVEN DURING THE YEAR 1910–1911

A. *Professor Rosanoff's Courses*

1. The Law of Mass Action, Tuesdays and Thursdays at 10.45 to 12.00. First half-year. This specialized course deals almost exhaustively with the methods and results of static and kinetic studies in homogeneous systems. Together with the course mentioned in the following paragraph it is expected to aid the student in acquiring a solid working knowledge of the modern theory of chemical reactions.

2. Equilibrium and Velocity of Changes in Heterogeneous Systems, from the viewpoint of the Phase Rule, the Law of Mass Action and the principles of thermodynamics. Tuesdays and Thursdays at 10.45 to 12.00. Second half-year.

3. Organic Stereo-Chemistry, Fridays at 12. This course presents an opportunity for a review of several important chapters of organic chemistry, especially the carbohydrates, the structure of benzene and of ethylenic compounds, etc.

4. Colloquium, *directed jointly by the members of the departmental staff.* This is held once in two weeks during the first half-year and once a week during the second half-year, Tuesday afternoons from 4 to 6 or Tuesday evenings from 8 to 10.

B. *Dr. Merigold's Course*

5. The Principles and Methods of Atomic Weight Determinations, Wednesdays at 10 A.M. The object of this course is to acquaint the student with the methods of atomic weight research. A number of classical contributions from Professor Richards' and other laboratories are studied analytically, with especial emphasis on the processes employed in the high purification of inorganic substances.

C. *Dr. Clark's Course*

6. The Carbocyclic Compounds, Tuesdays at 9 A.M. This course attempts a critical study of the physical and chemical methods used in determining the constitution of carbocyclic compounds. Among the substances included are the more important derivatives of benzene, naphthalene, anthracene, furfurane, thiophene, pyrrol, coumarone, indol, the azoles, pyrones, pyridines, quinolines, acridines, and azines.

D. *Professor Story's Course*

7. Practical Applications of Mathematics, Tuesdays and Thursdays at 12. The aim of this course is to help the student acquire that mathematical knowledge without which the professional education of a chemist, whether engaged in teaching or in industrial work, is to-day no longer complete.

E. *Professor Noyes's and Other Special Lectures*

8. In the capacity of Non-resident Lecturer on Chemical Research in this University, Professor Arthur A. Noyes presented here, on December 13th and December 15th, an account of the present state of the study of the anomalous behavior of strong electrolytes carried on in the Research Laboratory of Physical Chemistry of the Massachusetts Institute of Technology.

On January 20th Professor Arthur Michael lectured on the aims and results of his present researches on reversible organic reactions.

Arrangements are being made for other special lectures and brief lecture courses to be given here, during the remainder of the academic year, by prominent chemical investigators.

ONE CANDIDATE'S EQUIPMENT

In order to give anyone who may be interested some insight into the actual working and results of the arrangements made in the Department, it seemed desirable to make a statement as to the work here of one student, at present a maturing candidate for the Doctor's degree:

I. Research

The candidate began his research, dealing with the cause of the relative velocities of certain organic reactions, in October, 1908, and has continued the study ever since. The work consists in precise measurements of reaction velocities, combined with other physico-chemical measurements and preparative organic work. It has given the candidate no little insight into the methods of chemical kinetics and statics.

II. Courses Taken

First Year:

1. The hydro-aromatic series, including the monocyclic and polycyclic terpene bodies (Dr. Rosanoff).
2. Organic stereo-chemistry (Dr. Rosanoff).
3. Special methods of inorganic analysis (Dr. Merigold).
4. Organic synthesis (Dr. Rosanoff).
5. Chemical mathematics (Dr. Story).

Second Year:

6. General and physical chemistry, especially gases, liquids, and solutions (Dr. Rosanoff).
7. Dyestuffs, alkaloids, and polypeptides (Dr. Clark).
8. Inorganic stereo-chemistry; radio-activity (Dr. Merigold).
9. Thermodynamics, with some emphasis on applications to chemistry (Dr. Webster).
10. Supplementary and explanatory course in thermodynamics (Dr. Hubbard).

During his second year the candidate also acted as teaching assistant in organic synthesis in the Collegiate Department (one afternoon a week).

Third Year (current):

11. The law of mass action in homogeneous systems (Dr. Rosanoff)
12. The phase rule and the law of mass action in heterogeneous systems (Dr. Rosanoff).
13. Constitution of derivatives of benzene, naphthalene, anthracene, etc. (Dr. Clark).
14. Methods of atomic weight determinations (Dr. Merigold).

During the current year the candidate is also attending for the second time Dr. Rosanoff's lectures on organic stereo-chemistry and is spending a small fraction of his time as Research Assistant in the University Department.

III. Papers Reported by the Candidate in Colloquium

1. Jean Rey. "The Increase in Weight of Tin and Lead on Calcination." (Alembic Club Reprints.)
2. Mayow. "Medico-Physical Works." (Alembic Club Reprints).
3. Priestly. "The Discovery of Oxygen." (Alembic Club Reprints).

4. Scheele. "The Discovery of Oxygen." (Alembic Club Reprints).

5. Ipatieff (pyrogenetic researches), *Berichte*, *34*, 596 (1901).

6. Ipatieff (same subject), ibid., 3579 (1901).

7. Ipatieff (same subject), ibid. *35*, 1047 (1902).

8. Perkin and Pickles (synthesis of terpenes), Trans. London Chem. Soc., *87*, 639 (1905).

9. Perkin and Matsubara (same subject), ibid., *87*, 661 (1905).

10. Baeyer (terpenones of the carvone group), *Berichte*, *27*, 1916 (1894).

11. A. A. Noyes (conductivities at high temperatures), J. Am. Chem. Soc., *30*, 335 (1908).

12. A. A. Noyes (conductivity and ionization of polyionic salts), J. Am. Chem. Soc., *31*, 987 (1909).

13. Bredig (osmotic pressure and the Van der Waals equation), *Zeit. physik. Chem.*, *4*, 444 (1899).

14. A. A. Noyes (same subject), ibid., *5*, 53 (1890).

15. Abegg (same subject), ibid., *15*, 254 (1894).

16. Freund, Martin, and Achenbach (action of hydroxylamine on certain derivatives of anthraquinone), *Berichte*, *43*, 3251 (1910).

17. Rabe (on a peculiar connection between the strength and action of acids), ibid., *43*, 3308 (1910).

18. Lecture on the manufacture of essential oils (based largely on Muspratt).

19. Lecture on the Grignard reaction.

20. Account of the life of Lord Kelvin.

21. Account of the life and work of Van't Hoff.

22. Lecture on the results of the candidate's own first two years of research.

Several further papers will be reported on by the candidate during the remainder of the current year.

The instructors believe that the candidate will have acquired here a fund of chemical culture and earned for himself a degree that will be respected wherever he goes, either in this country or abroad.

FACILITIES

The University chemical laboratories occupy a considerable part of the laboratory building. The storerooms contain

an unusually large collection of organic preparations, besides all the ordinary inorganic chemicals. The collection of physico-chemical apparatus, including the latest form of Pulfrich's refractometer, an excellent Schmidt and Haensch polariscope, a fine spectroscope, a large Hilger quartz spectrograph, a Burkhardt calculating machine, an Altschul apparatus for measuring critical pressures, specially constructed large constant-temperature stillheads, a set of excellent thermostats, sets of fine thermometers, etc., is sufficient for most ordinary purposes. Whatever special apparatus and chemicals are needed in connection with the work of research are ordered at once, every reasonable effort being made to help the student obtain a maximum of results with a minimum expenditure of time and energy. In this connection it may be mentioned that the Department is at liberty to use the services of the skilled mechanician regularly employed by the Department of Physics. Students will themselves prepare their chemicals, or build their research apparatus, only in those case in which the Director may consider such work especially instructive to them.

The Director of this Laboratory is Secretary of the Association of American Chemical Research Laboratories, formed at the second decennial celebration of Clark University in 1909. *Inventories of the more important research laboratories are kept here, and any chemical needed in an investigation, if not in our own stock, is promptly supplied by some other member of the Association.* Such exchange of chemicals by laboratories entitled to duty-free importation has recently been declared by the authorities at Washington to be perfectly legal. It is certainly of the greatest help to members of this Department.

THE LIBRARY

The library of Clark University has, independently of the other departments, a magnificent endowment of its own. Its chemical collection contains complete files of all the more important journals in English, German, and French, and a rapidly increasing number of general treatises, monographs, and reference works. The income of the library permits of purchasing at once *all* books needed by anyone engaged here in chemical research.

Part of the collection, including the files of the *Zeitschrift ür physikalische Chemie*, the *Berichte der deutschen chemischen Gesellschaft*, the *Transactions of the Chemical Society of London*, the *Journal of the American Chemical Society*, the *Chemisches Zentralblatt*, and a number of reference works, forming a small departmental library proper, is kept in one of the laboratory rooms and is accessible to all members of the Department at all times. The departmental library, for the establishment of which the Department is deeply indebted to Dr. Louis N. Wilson, Head University Librarian, is one of the most valuable aids in the work of both instructors and students. It will be gradually enlarged.

SCHOLARSHIPS AND FELLOWSHIPS

The Department has at its disposal several Scholarships and Fellowships, which will be awarded each year to the ablest and best recommended applicants. Scholars, and especially Fellows, will coöperate with the Director in maintaining a harmonious and scientific atmosphere in the Department and in promoting all the ends of the University. They will have no duties besides that of making the best use of the facilities for study and research offered to them.

RESEARCHES CARRIED ON IN THE DEPARTMENT SINCE THE INSTALLATION OF ITS PRESENT HEAD, SEPTEMBER, 1907

1. Practical elaboration of a new method for determining the partial vapor pressures of organic mixtures, and determination by means of it of the vapor pressures of a number of typical binary mixtures (published; *crowned by the American Chemical Society with the Nichols gold medal of its New York Section*).

2. A quantitative study of the Victor Meyer Esterification Law and the Steric Hindrance hypothesis (published).

3. A quantitative study of steric hindrances in the esterification of fatty acids (published).

4. Perfection of a precise and rapid method for determining halogens in organic compounds (published).

5. A study of the transformation of aldohexoses into alcohol by ferments, enzymes, and alkalies (uncompleted).

6. A new relationship between the vapor pressures of binary mix tures and a general quantitative theory of fractional distillation (ready for publication).

7. Experimental study of fractional distillation in the light of the results of the preceding research (ready for publication).

8. A theoretical study of the variation of the vapor composition of binary mixtures with the temperature (ready for publication).

9. A study of the mechanism of iodination in the aromatic series by halogen carriers (uncompleted).

10. A new study of steric hindrances in esterification (in progress).

11. A precise quantitative study of the phenomena of direct esterification and ester hydrolysis (in progress).

12. A study of the kinetics of certain inorganic reactions (temporarily interrupted).

13. A precise study of the decomposition of tertiary amyl esters (in progress).

14. A peculiar transformation of benzo-bromamide (temporarily interrupted).

15. An improved method for the preparation of acetamide (ready for publication).

16. Definition of an Ideal Gas (in collaboration with Professor Webster; published).

17. A new study of the Duhem-Margules equation (in collaboration with Professor Story; nearly ready for publication).

18. A theoretical revision of some of the principles of the theory of solutions (in progress).

19. A new study of the dynamics of sugar inversion (in progress, one part ready for publication).

20. A rapid method for measuring partial vapor pressures (ready for publication).

21. Limitations of the constant-temperature stillhead (ready for publication).

22. A study of esterification equilibrium in the gaseous state (in progress).

23. An improvement of the preparation of para-nitro-phenol (published).

24. Determination of the relative strengths of organic acids by a new physico-chemical method (in progress).

25. A study of the decomposition of nitroso-compounds by potassium hydroxide (in collaboration with Professor W. A. Noyes, of the University of Illinois; in progress).

26. The working of the constant-temperature stillhead in the case of mixtures with maxima or minima in the boiling-point curves (ready for publication).

27. A new lamp, giving an exceedingly intense monochromatic light (ready for publication).

IV. BIOLOGY

The aim of the department is to develop investigators well grounded in the history, principles, problems and methods of modern biological science. Since the first step in any research is a knowledge of all that has been learned on the subject to date, the library of the department has been selected with a view to the best classical monographs, texts, journals and especially complete sets of indexes, Jahresberichte and Centralblätter, from which a complete bibliography of any subject can quickly be obtained. Both lectures and laboratory work in the courses described below are especially designed to facilitate practical acquaintance with the methods and apparatus of research, and, as soon as practicable, each student is expected to begin a piece of original investigation. The laboratories are equipped with standard apparatus of most approved types, and if new work requires specially devised apparatus, every effort is made to obtain it. It is thus the aim of the laboratory to place at the disposal of those interested in the solution of biological, physiological and neurological problems the best possible facilities for the prosecution of their work.

The field of modern biological science is so broad that laboratories as well as men are obliged to specialize. The department has for the past few years undertaken to work out a series of problems in the dynamics of living organisms, studies on the activities of animals and plants. Instead of, and in addition to, understanding structure and form the attempt has been made to gain an adequate expression for species

as forces in nature. This is distinctly a new point of view, and when we ask such questions of a species as: What do you do? What is your work in the economy of nature? What is your daily life? Your rhythms of work and rest Do you sleep? Do you play? Do you adapt yourself intelligently or mechanically to your environment? What relation has your work to human interests? What are the conditions of your highest vigor, activity and efficiency? How will this or that change in your environment affect your life? How do you vary?—when we ask these questions of the commonest species, we find ourselves on new ground, alive with new and vital problems.

In this large field studies of the daily life of a series of animals—amœba, vorticella, hydra, earthworm, crayfish, toad, rat, bobwhite—have yielded most valuable results, and other forms equally interesting await study. Another line which is possibly of even greater promise, is the investigation of the effects of different conditions, foods and drugs, exercise, infections of various kinds, on the vigor of the germ plasm and consequent stamina and viability of offspring. Several researches have been made and are in progress and many more are projected in this field.

It is high time that university biology began to concern itself with problems of the adequate control and protection from extinction of valuable American species. Work on the biology of the ruffed grouse, sharp-tailed grouse and bobwhite has been in progress for several years past, a plan to save the passenger pigeon from total extinction has been developed and, if any still remain, gives hope of proving effective, and plans have been sketched for similar studies on the wood duck and woodcock, two other "vanishing species," prairie chicken, wild turkey, wild swans, geese and other water-fowl, and several species of plover whose extinction is imminent. The biology of all these species, and many more,

must be worked out in detail so that we can know and teach generally the conditions under which the perpetuation of each and every valuable American species may be assured.

Along with the above considerable attention has been given to organization of biological instruction through the public schools, high school, college and university.

The above will serve to explain briefly the courses offered below.

1. Dynamic Biology and General Physiology. It is proposed to combine in this course the fundamental laws and principles of biological science, the emphasis being placed on the functional or dynamic side rather than on the side of morphological structure. In other words, the point of view of the course is that living species have assumed certain forms and have developed definite structures in order to fit them to perform a certain work in the economy of nature. The first half-year is devoted to the study of a typical series of animals as forces in nature, special attention being directed to American problems and to the methods and apparatus by which dynamics of species may be investigated. On the side of biological theory, which occupies the last half of the year, among others the following topics will serve to outline the scope of the course. Origin and constitution of living matter. Physiological functions. Classifications of plants and animals. Biological reactions, tropisms, experimental morphology. Differentiation of organs. Growth and reproduction. Heredity. Variation. Dr. Hodge, two lectures weekly, October to June. Laboratory work will be arranged to meet the needs of individual students. 1911–1912.

2. Evolution and Heredity, History, Theorie and Data. This course will aim to present the main outlines as any student of modern science should have them from the Greek evolutionists through Bonnet, Lamark, the Darwins and down to the present. Hereafter this course will be divided into a three year cycle as follows:

I. Data of Evolution. The aim of this course is to marshal the concrete evidences from Comparative Anatomy,Embryology and Paleontology and Geographical Distribution in support of a phyletic sequence in the development of animal types. The course will be well illustrated with charts and specimens. Dr. Newton Miller, one lecture weekly, February to June, 1911.

II. Heredity. History and theories and especially the experimen-

tal data which have accumulated in recent years. Special attention will also be given to human inheritance, 1911–1912.

III. History of Evolution. The object of this course will be to present in chronological order development of ideas and theories of evolution from the Greek to present times, 1912–1913.

3. Animal Behavior. This is a new course, the materials for which have been collecting for several years. It will deal with the normal, biological reactions of a series of typical animals as a rational basis for experimental work in comparative psychology. It may also serve to suggest to psychologists many problems both for research and for observational study in the laboratory. On the purely biological side we are beginning to see that control of animal life in all its many phases from domestication of species to extermination of undesirable forms depends for success upon a knowledge of the laws and principles of animal behavior. This phase of zoölogy is thus closely related to the economic and will draw naturally from the researches of the scientific departments of the government, the data of which have never before been gathered together and presented from this point of view. The course will be illustrated by living specimens, so far as possible, and by a complete series of charts already in the possession of the department. Dr. Hodge, two lectures weekly, from October to February, 1912–1913.

4. Biological Instruction. The aim of this course will be to present the results of the Conferences on Biological instruction held in connection with the Second Decennial Celebration of Clark University, and to develop a plan for the organization of such instruction throughout the entire system of education. It will discuss briefly first biological nature study in the elementary schools, consider the problem of the high school course, the history and development of the college course and close with the history, aims and methods of biological research and its present organization in universities and research institutions. Dr. Hodge, two lectures weekly, October and November, 1911.

5. Special Biological Lectures. In this course all members of the Department are given an opportunity to present in lecture form topics—reviews of books and important investigations and particularly results of their own researches. About one lecture weekly, throughout the year.

It is intended to arrange the course in such a manner that the general field may be covered in two years. This will leave the student free to devote his entire time during the third year to special study in the literature of the science and to the prosecution and completion of his thesis work. Accordingly, a two-year cycle will be arranged as follows:

6. Comparative Study of Nervous Systems and Sense Organs. This course will form the natural anatomical background for comparative psychology and together with the working out of a minor problem may well constitute a minor for one whose major is psychology or philosophy. On the biological side it will be closely correlated with general physiology and morphology. It is intended to begin with a comparative study of structural elements of the nervous system of both invertebrates and vertebrates and then correlate and compare the different degrees of complexity of function with the anatomical organization found in the ascending series. The course will be illustrated throughout by diagrams, models, dissections and microscopical preparations and experiments. Laboratory work one afternoon weekly, or arranged to meet the needs of individual students. One hour weekly, for general class exercise, or its equivalent.

7. The Human Nervous System and Sense Organs. This course will deal with the anatomy, both gross and microscopic, and with the physiology and hygiene—fatigue and sleep, growth and development, brain localization. One hour weekly, or the equivalent. Laboratory one afternoon a week, or arranged to meet the needs of individual students.

By way of supplementing the above and courses in other departments of the University, three special courses have been planned as follows:

8. Practical Histology. The course will be a laboratory course, with such lectures, directions and conferences as may be required by those taking it. It will be arranged practically to meet the needs of

[1] Negotiations are under way to secure a special instructor to take charge of these courses.

individual students. Considerable latitude will be given, so that any who wish may make it a comparative study by way of supplementing courses 1, 3, 4 or 5, prepare a series of demonstrational specimens for themselves, or devote their time to special problems.

9. For those who do not take work in the laboratory, but desire to see the actual specimens and experiments, a course of demonstrations to run somewhat parallel with the above courses will be offered. One hour weekly, through the year.

EXPERIMENTAL WORK

Laboratory work in biology, physiology, histology, and neurology is arranged to meet the needs of individual students. In case one has not decided on a special line of research, the resources of the department are such that he will be given a fairly wide range of problems from which he may select a subject suited to his tastes and attainments. A course in biology such as is given in our best colleges and State universities is sufficient to enable students to begin work here.

A long-felt need of the department is now supplied in the possession of land well adapted and conveniently located for biological research. Ideal facilities can now be offered for the study of daily rhythms, life and work of species under natural conditions; and also for experiments in animal and plant breeding. It is proposed to organize an extended series of researches upon the effects of different chemical substances and conditions of life upon the viability and vigor of the germ plasm.

While no regular laboratory fees are charged, each student is expected to refund to the laboratory the cost price of all the more expensive reagents, including alcohol, ether, chloroform, formalin, celloidin, and the like. Each student must supply his own microscopical glass, slides and covers, and must pay the cost price of all glassware that he breaks. All students are expected to take the best possible care of all

apparatus entrusted to their charge, and to return it to the laboratory clean in and good order.

The Journal Club meets weekly, for the purpose of reporting and discussing important articles in the current periodicals.

V ANTHROPOLOGY

DR. CHAMBERLAIN will lecture twice a week throughout the year. The courses offered endeavor to cover the following field:

GENERAL ANTHROPOLOGY, embracing: (a) History, scope and relations of the science. (b) PHYSICAL ANTHROPOLOGY; problems, investigations, results, laboratory work. (c) ETHNOGRAPHY; races and race-origins. (d) ETHNOLOGY, INCLUDING SOCIOLOGY; origins and development of the arts and sciences, institutions, ideas and ideals of man and the races of man, human civilizations, their origin and development. (e) MYTHOLOGY; folk-lore, religions. (f) LINGUISTICS; race and language, origin and development of language and of languages, psychology of language, gesture-speech and written language, comparative linguistics, comparative literature. (g) CRIMINAL AND PATHOLOGICAL ANTHROPOLOGY; physical and mental, ethnic morals. (h) HISTORICAL AND ARCHAEOLOGICAL; primitive man and primitive culture, the precursors of man.

SPECIAL ANTHROPOLOGICAL TOPICS most akin to Psychology and Pedagogy, embodying the results of the most recent and important studies and investigations of the following and other subjects, particularly: The Characteristics of the Primitive Races and their Rôle in Human History; The Physical Anthropology of Infancy, Childhood, Youth, Manhood, Old Age; the Anthropological Phenomena of Growth, Arrested Development, Degeneration; Anthropological Aspects of Heredity and Environment in the Individual and in the Race; Uncivilized Races and Civilized Races; the Phenomena of Race-Mixture; the Evolution Problems of Humanity; Education among Primitive Peoples; the Anthropological History of America; the Interpretation of Folk-Lore; the Psychology of Primitive Peoples; the Trend of Human Progress; the Psychology of Primitive Languages; the Mind of Primitive Man and its Expressions; the Development of Human Personality; the Rôle of the Individual in Primitive Culture; Progress and its Criteria; the Orient and the Occident in their Relations to Human Evolution; the Negro in Africa and in America; the American Indian; the Anthropology of Japan and China; "World Languages" and "World Culture."

The lectures in Anthropology will have special bearing upon the courses in Psychology and Pedagogy in the University, and every effort will be made to utilize the latest results of Anthropological investigations.

From time to time, the most valuable current literature will be reviewed and students made acquainted with the best contributions to Anthropological Science in the various foreign languages. An annotated Bibliography of the "Periodical Literature" of Anthropology, by Dr. Chamberlain, is published yearly in the *American Anthropologist* and the *Journal of American Folk-Lore*. The importance of a thorough acquaintance with the bibliography of their subjects is impressed upon all students, and all possible assistance in this direction is always at their disposal.

VI PSYCHOLOGY

A complete course in Psychology at Clark University includes the following subjects:

1. Anatomy and Physiology of the Brain and Spinal Cord, sense organs, and other parts of the body, especially the muscles—the organs of the will—in so far as they are concerned with mental processes,—together with a good general background of biology. For this a special laboratory is equipped. See Dr. Hodge's announcement.

2. Physiological and Experimental Psychology, including an outline of the anatomy and physiology of the central nervous system and sense-organs; the elementary sense experiences; sensation and perception; the measurement of sensational intensity; space; time; reaction-times; affection and emotion; memory; association; attention; apperception; will; the "higher mental processes;" inter-relation of mind and body. For this a special laboratory is equipped. See Dr. Baird's announcements.

3. Comparative and Genetic Psychology. Review of the general doctrine of evolution as a basis for the evolution of mind. Discussion of experimental and observational studies upon typical forms of animal life, beginning with the protozoa. Instincts; animal and human infancy. Childhood and adolescence. See announcement of Drs. Hall, Baird and Porter.

4. Abnormal and Morbid Psychology, as nature's experiments, *e. g.*, border-line phenomena as seen in neurotic subjects, prodigies, and geniuses; defectives, such as the blind, deaf, criminal, idiotic; mental and nervous diseases, epilepsy, phobias, neurasthenia, hysteria; morbid modifications of will, personality and emotion, etc. Special clinical facilities for this work are open to the department in the hospitals and other institutions of the city. See Dr. Hall's lectures and Dr. Cowles' lectures and clinic.

5. Anthropological Psychology; myths, customs and belief, comparative religion and psychology of religion, primitive art, and the study of the life of savages and children; adolescence and senescence; physical

measurements illustrating laws of growth in size and power, etc. See Dr. Chamberlain's courses.

6. Æsthetics and Ethics, the psychology of music, painting, literature, the phenomena and laws of volition and morality.

7. History of Psychology and Philosophy, including the chief culture institutions, science, medical theories, Christianity, and education generally. Dr. Hall's historical courses and seminary.

8. Applications of Psychology, Pedagogy, including mental and moral hygiene and regimen, school organization and methods from kindergarten to university; the sex problem; defectives, etc. Dr. Hall's and Dr. Burnham's courses.

9. The Psychology of Sex; lessons from the aberrations of this instinct; some of its normal phenomena; the current theories; psychic differences between men and women; education of girls; fatherhood, motherhood; instruction of the young in matters pertaining to sex; theories of Freud, Moll, Ellis, etc.

10. The Psychology of Border-Line Phenomena, including spiritism, telepathy, hypnotism, dreams, multiple personality, somnambulism, crystal gazing, dousing, mind reading, sleight of hand performances, major symptoms of hysteria, psychotherapeutics and mind cure, methods of psychological analysis, etc.

The aim of the Psychological department is to cover this field as well as its instructors are able to do so in two or three years.

EXPERIMENTAL PSYCHOLOGY

The primary purpose of this department is to train students for the investigation of psychological problems. The lecture courses and the Journal Club aim to familiarize the student with the history and the present status of psychological experimentation; the laboratory courses are arranged with a view to training him in experimental procedure, and equipping him for independent research.

LABORATORY

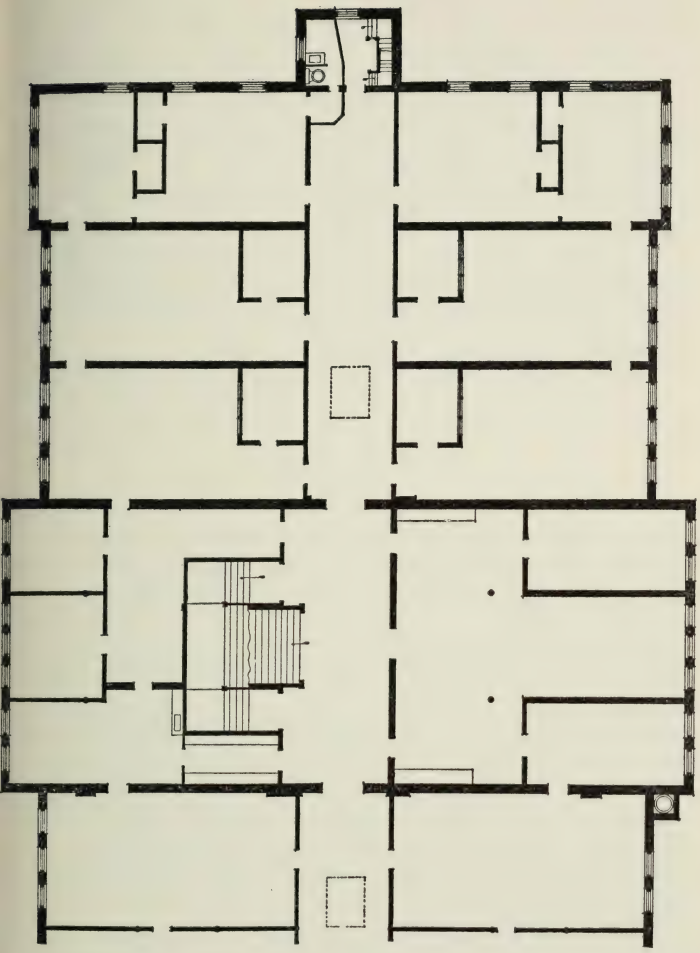
The psychological laboratory occupies a suite of twenty rooms on the upper floor of the main building of the university.

These rooms, as at present arranged, are devoted to the following purposes: office, lecture-room, seminary and reading-room, dark-room, work-shop, general apparatus-room, and a group of rooms for research.

The laboratory is well equipped with general apparatus; and it has an annual appropriation sufficient to provide for the purchase and manufacture of such apparatus as is required from time to time for special investigations. The work-shop contains power- and other lathes, and power-drill, and an abundant equipment of tools and materials for the manufacture and repair of apparatus. The services of an expert mechanician are available; and every facility is provided for the devising and constructing of apparatus appropriate for the solution of such special problems as are undertaken.

The library contains an unusually large collection of psychological literature. It is especially well supplied with scientific periodicals, and proceedings of learned societies. Since the enrolment of the department consists exclusively of graduate students, and is, therefore, relatively limited in numbers, it is possible to give to each student of the department a maximum of freedom in the use of the library. Besides having access to the university library, students of the laboratory have at their disposal an excellent working-library of psychological books and periodicals which are shelved in the seminary-room.

The more general and fundamental courses of lectures in the department are repeated each year, while the more advanced and specialized courses are given only in alternate years. A feature of the method of instruction at Clark University is the frequent informal conferences between instructor and student. The Journal Club meets weekly (two-hour sessions) for the discussion of the current literature. The more valuable contributions presented by the members of the Club will be published in the *American Journal of*



PSYCHOLOGICAL LABORATORY

Psychology. The laboratory work includes an introductory and a research course. The former is designed to familiarize the student with the efficient handling of apparatus, and to acquaint him with the methods to be followed and the precautions to be observed in psychological experimentation. This course is repeated each year; it, or its equivalent, is a prerequisite to all other work in the laboratory. The research varies from year to year.

Provision for Comparative Psychology is now made at the Hadwen Arboretum, about fifteen minutes' walk from the main building of the University, where special facilities for the care of the animals have been provided.

The following courses are announced for the academic year 1911–1912.

DR. HALL'S COURSES

DR. HALL will probably give the following courses next year, although variations from this programme may be made if there is reason to believe that the greatest good of the greatest number of students will be thereby promoted:

1. THE HISTORY OF ANCIENT PHILOSOPHY. This course, while embodying most of the general material and literature upon the subject, will be treated rather from the point of view of natural history or anthropology. The reasons will be sought for each philosopher, why and how he came to his own views, and the culture history standpoint will be stressed. The lectures in the history of philosophy will be given from the point of view that the great systems rarely say what they mean, but have to be interpreted in the larger light of history and in ways not entirely unlike those used by psycho-therapy. This course is part of a larger one extending over two of three years, covering the entire history of philosophy, ancient and modern.

2. THE PSYCHOLOGY OF RELIGION. This, too, is part of a larger course comprising primitive religions from animism and fetichism up, the great ethnic religions including Judaism and Christianity, ending with the course on the psychology of Jesus.

3. The Psychology of the Emotions and of Sex. In this course fear, anger, pleasure and pain, jealousy, pity, and love and the sex feelings are discussed, and the latest studies of experimental and genetic psychology are brought together and compared in this field.

4. Abnormal and Border-Line Psychology, with Special Reference to the Freud School. This course résumés the rather copious literature in this field and is designed to introduce the student to a better knowledge of such phenomena as fuges, somnambulism, hystero-epilepsy, hypnotism, magic, mirror gazing, touching even the problems of spiritism and telepathy, Emmanuelism, etc., but maintaining always the scientific point of view.

5. Some Vital Problems of Education. This course is given Saturdays for teachers and the special field it covers will be announced later.

6. The Seminary, at Dr. Hall's house, three hours every Monday evening through the year.

7. Researches with individuals on special topics.

DR. BAIRD'S ANNOUNCEMENT OF COURSES

1. General Psychology. A course of lectures and demonstrations dealing with sensation, affection, attention, volition and perception. This course will present, in concrete and systematic form, the more important facts that have been yielded by the experimental investigation of the simpler mental processes, together with a discussion of theories that have been advanced from time to time. *Two hours a week. First semester.*

2. The Psychology of Memory, Imagination and the Process of Learning. Lectures and demonstrations dealing with the phenomena of mental acquisition and retention; imagery, association and reproduction, the phenomena of learning and forgetting, the function and development of habits. *Two hours a week. Second semester.*

3. The Psychology of the Higher Intellectual Processes. The psychology of meaning, abstraction, thought, judgment, reasoning; the function and significance of imagery; the phenomena of *Einstellung* and *Bewusstseinslage*. *One hour a week. Second semester.* (This course will be offered in 1911–1912 and in alternate years thereafter.)

4. Psychological Systems. A statement and discussion of the characteristic features of the systematic doctrines embodied in the writings of Angell, Calkins, Ebbinghaus, Kuelpe, Muensterberg,

Titchener, Wundt and others. *One hour a week. Second semester.* (This course will alternate with Course 3.)

5. Journal Club. A seminary for the informal discussion of current psychological literature. Meetings are held weekly throughout the year.

6. Introductory Experimental Course. In this course the student will perform a series of standard psychological experiments, chiefly for the purpose of mastering the technique of experimentation. The course will be given by an assistant, under the general direction of Dr. Baird. *Four to six hours a week, throughout the year.*

7. Research Course. Under this title are grouped the special investigations undertaken by students in the laboratory. *Topics and hours to be arranged.*

The following courses offered by Professor James P. Porter in Clark College are open to students in the University:

1. General Psychology. Three hours a week, throughout the year.

2. Genetic and Applied Psychology. Two hours a week, throughout the year.

3. Laboratory Course in Experimental Psychology. Two hours a week, throughout the year.

DR. PORTER'S ANNOUNCEMENT OF COURSES

1. Animal Behavior. Lectures on the tropisms, reflexes, instincts and mental processes, particularly the learning process of animals. The social insects, ants, bees and wasps, and the gregarious higher animals, birds and mammals, will be chiefly dealt with during the first half of the year. By this means an attempt will be made to satisfy the interests and needs of students chiefly concerned with human societies.

For methods of investigation and interpretation as well as results the works of such writers as the following will be reviewed and discussed: Forel, the Hubers, Wheeler, Bethe, Wasmann, von Buttel-Reepen, the Peckhams, Fielde, Lubbock, Plateau, von Uexküll, Espinas, Darwin, Lloyd Morgan, Washburn, Thorndike, Jennings, Loeb, Yerkes, Watson and others. The final aim of the course is to give as adequate a review of the nature and evolution of mental processes in animals

as our present knowledge will allow. Diagrams, lantern slides and apparatus will be used by way of demonstration. One hour a week.

2. Social Psychology. In this course the following are some of the topics considered: the psychological views of early writers such as Comte, Spencer, Lewes, Tarde and others; the nature and laws of "social mind"; the facts and generalizations of Child-Psychology as determining the point of view and methods of Social Psychology; human instincts and intelligence and their rôle in human society; the origin and development of social laws; heredity and social heredity; suggestion and imitation; brief reference to the development of languages, myth, and religion as illustrative of laws of social and mental evolution. Sociological and historical facts are considered from the psychological and genetic points of view. Besides the monograph literature, the works of such writers as Tarde, Davis, Ross, McDougall, Cooley, Wundt, Royce, Baldwin, Woods, Thomas and others are used as references. One hour a week for the second half-year.

At the Hadwen Arboretum, where a "station for the study of animal behavior" has been established and is now under Dr. Porter's direction are found facilities for the study of certain forms of animal life; and here too will be found some of the illustrative material for his lectures.

Psychiatry

Dr. Cowles, lecturer on Psychiatry, former head of the McLean Hospital at Waverley, Mass., will give a course at the University and clinical demonstrations at the Worcester Insane Hospital. Dr. Cowles's course includes the following topics:

1–2. The Dependence of Psychiatry upon Mental and General Physiology; the concept of energy fundamental; the reflex arc and integrative action of the nervous system. Relation of inhibition to anabolism, to external function and katabolism.

3. The Physiology and Pathology of Emotion; depression and exaltation figurative expressions in psychology, both being excitative and katabolic; relations of feeling-tone to conditions of ill-being.

4. Psychasthenia and Neurasthenia; the minor psychoneuroses—psychological automatism, fixed ideas, hysteria.

5–6. Mental Symptoms of Nervous Exhaustion; their genesis in reductions of functional capacity of the nervous and mental mechanism.

7–10. The Melancholia-mania Group of Neuropsychoses (not tending to dementia).

11–20. The Deteriorating Psychoses:—dementia praecox, general paresis; senile dementia. Involution psychoses; paranoia.

Dr. Cowles's lectures are open without fee:

(1) To all members of the Faculty of the University and College;

(2) To all members of the Psychological Department, and to members of the College who are taking other psychological courses in the University.

The fee for all other persons is $10.00.

VII PEDAGOGY

This department offers a course which can be taken for the degree of Doctor of Philosophy. Its work is in the closest connection with that of psychology and anthropology, and in part based on these subjects. The work in this department is intended to meet the needs of the following classes of students.

First. Those intending to teach some other specialty but who wish a general survey of the history, present state, methods, and recent advances in the field of university, professional and technical education.

Second. Those who desire to become professors of pedagogy, or heads or instructors in normal schools, superintendents, or otherwise to become experts in the work of education.

The programme of the Pedagogical Department includes courses upon the following subjects:

1. (*a*) Child Study, (*b*) Pedagogical Psychology. (*c*) Experimental Pedagogy. (*d*) School Hygiene.

2. (*a*) Principles of Education. (*d*) History of Education and Reforms. (*c*) Methods, Devices, Apparatus, etc.

3. (*a*) Organization of Schools in Different Countries. (*b*) Problems of College Education. (*c*) The Teaching Profession. (*d*) Motor Education, including manual training, physical education, etc. (*e*) Moral and Religious Education. (*f*) Ideals.

The courses in pedagogy for 1911–1912 will be as follows:

A. Pedagogical Applications of Psychology. Some of the most important chapters in psychology in their education aspects, such as habit, attention, interest, memory. Such topics as the following are discussed: The correlation of physical and psychic processes. Education of the senses. Apperception and association. Defects of memory. Experimental investigations of memory. The learning process. Economical methods of learning. Feeling and interest in relation to instruction and training. The instincts of children as the basis of apperception and interest, imitation, rivalry, co-operation. Suggestion as a factor in education. The training of the will. Mental diseases and the faults of school children. Neuroses of development. Psychological contributions to the hygiene of instruction. The point of view is that of genetic psychology. *Once a week, throughout the year.*

B. Hygiene of the School Child. This course is supplementary to the course on the hygiene of Instruction given in 1910-11. Some of the more important chapters in modern school hygiene will be considered, including such topics as: The conditions that determine growth and development. Physiological age. The physical and mental differences between children and adults. The general principles of somatic and mental hygiene. The hygiene of the senses. Modern studies of defects of sight and hearing. School diseases. The hygiene of the voice, the mouth, the teeth, the nose. Mental diseases and faults of children. Neuroses of development. Tests of ability to work and of physical condition. Medical inspection. The hygiene of discipline. The development of healthful mental activity. The hygiene of memory, attention and feeling. The hygienic aspects of recent psychological studies. *One hour a week, throughout the year.*

C. Seminary. The work will be determined in part by the needs of the students who elect this course. It will probably be devoted chiefly to experimental pedagogy. It is hoped, also, that each student will select, after consultation with President Hall and Dr. Burnham, a topic for special investigation. The results of such studies may be published. *One or two hours a week, throughout the year.*

PRESIDENT G. STANLEY HALL'S COURSE

Includes:

1. The General History of Education from ancient times to the present.

2. The Psychology and Philosophy of Education in general. This is treated as a background to child study and genetic psychology as applied to education.

3. Child Welfare Institutions Outside the School.

4. Various Educational Topics of Special Present Interest.

5. Higher Pedagogy, including the high school, college, university, law, medical, theological, technical schools, the endowment of research, etc.

His course the next academic year will be made up of courses 2, 3 and 5 as basis, the items to be specified in a later circular.

DR. EDMUND C. SANFORD'S COURSE

The Problems of College Education. A discussion of the most important questions of college efficiency with especial reference to present day tendencies and criticisms. *One hour a week throughout the year.*

THE CHILDREN'S INSTITUTE

The Children's Institute, under the auspices of the Educational Department of Clark University, provides courses of lectures each year upon at least some of the following topics.

(*a*) A general survey of child welfare institutions in this country and abroad with the use of demonstrative material in the form of reports, circulars, by Dr. Theodate L. Smith, who also gives practical aid in the preparation of theses touching this subject.

(*b*) A course on the examination and treatment of subnormal and defective children with clinical demonstrations, this year given by Dr. Dennis F. O'Connor, assisted by Dr. Henry B. Moyle.

(*c*) A course in experimental pedagogy including the questionnaire and statistical method of apparatus and a survey of the history and literature, by Dr. Amy E. Tanner.

(*d*) Child linguistics scientifically applied. Last year this was by Dr. John A. Magni.

(*e*) Sex pedagogy and eugenics, by Dr. Rudolph Acher.

The Children's Institute has a large hall with three adjacent rooms, including one entire floor in the new Library Building devoted to an educational museum which is equipped with hundreds of maps, charts, diagrams, illustrative and other apparatus gathered from many countries to ease the work of teaching and make it more effective. This material is used in various departments, but especially by that of Education.

Special attention has been given to the collection of the circulars and other publications of nearly one hundred types of child welfare organizations with which the department seeks to keep in touch.

During the last year about a dozen social surveys were begun of problems in this city affecting child welfare and several experts were brought from a distance to coach the students who conducted these investigations. They included such topics as: Playgrounds of the city, their history, area, care, use; The Salvation Army; Midwives and their work and qualifications; Juvenile delinquency; Truancy; The Milk Problem in this city; Venereal Disease; The Italian population of the city; The Negroes; The Swedish population; The Activities of Protestant churches, etc. In connection with this work, a Child Welfare Organization Society was started in the city which now comprises some 250 members, and six of its large committees have been doing excellent work, one of them raising some $12,000 for playgrounds last summer.

A child conference lasting a week was held at which more than two score experts read papers, which are now printed in a volume of 286 pages.

The courses as announced above may be modified somewhat as the needs of the students or other circumstances may require.

The library of the department has a large collection of

EDUCATIONAL LITERATURE, being especially rich in German and French literature, and having a large number of official reports from various countries—English, French, German, Belgian, Swedish, etc.; also town and city reports, and reports of special institutions; and a collection of French, German, and American text-books.

The books are arranged under the following heads:

1. GENERAL.
2. HISTORY OF EDUCATION.
3. EDUCATIONAL SYSTEMS.
4. THE THEORY OF EDUCATION AND SPECIAL SCHOOL SUBJECTS.
5. EDUCATIONAL PSYCHOLOGY.
6. CHILD STUDY.
7. SCHOOL HYGIENE AND PHYSICAL EDUCATION.
8. TEXT-BOOKS.
9. MISCELLANEOUS.

Many of the more common educational books are accessible in the Worcester Public Library and have not been duplicated by the University. The large collection of educational text-books in the library of the American Antiquarium Society and its valuable historical material are also accessible to the University.

The collection of educational periodicals includes a large number of the best foreign journals—English, French, German, Swedish, etc.

The nucleus of an educational museum has been formed, which contains a valuable collection of EDUCATIONAL APPARATUS, pictures and other material for language lessons and *Anschauungsunterricht*, maps, charts, diagrams, models, illustrative material in school hygiene, etc. This is now merged with the museum of the Children's Institute.

The *Pedagogical Seminary* is a journal issued at the University, and serves as a convenient medium of publication for special investigations undertaken in the department.

In addition to the members of the University, special students are admitted during the year to the Saturday courses of Drs. Hall and Burnham in Education, for a fee of $20.

VIII ECONOMICS AND SOCIOLOGY

The courses here outlined indicate the scope of the work offered. Two courses of one hour each per week and a seminar are given each year.

1. Recent Economic Theory. This course is devoted to a comparative study of the theories of Jevons, Marshall, Clark, Böhm-Bawerk, Fetter, and Carver, as presenting the leading types of modern economic theory. The chief emphasis is placed on the problems of value and distribution; and on the influence of the growth of co-operation and consolidation. This course should be preceded by at least an elementary study of economic theory. Given in 1910-11.

2. Principles of Interpretation in Sociology. This deals with the various principles that have been used to interpret history and society. A variety of viewpoints and principles are taken up in turn, analyzed, their advantages and limitations discussed, and the results achieved by each indicated. Among those studied are: anthropo-geography; the philosophy of history; the great man theory; the economic interpretation of history; social economics; philanthropy; biological and organismic conceptions; the struggle of races; the division of labor; human interests; social control; imitation; social psychology; and like response to stimulus. Given in 1910-11.

3. Economic and Social Statistics. The first part of this course deals with various phenomena of population, such as births, deaths, marriages and divorces; and with wages and prices. The second part is an introduction to the statistical methods based on the theory of probabilities. In this some attention is given to the work of Galton and Pearson and other studies bearing on eugenics.

4. Seminar. During the current year the seminar has, in addition to reports on theses and some of the recent literature, made a study of the problems and results of eugenics.

IX HISTORY

Courses in History Offered by Dr. Blakeslee

1. United States History. Different periods in the history of the United States may be taken for intensive study successive years; in 1910-1911 the course deals with the history of the United States from the Missouri Compromise to the outbreak of the Civil War, with emphasis upon the years following the Compromise of 1850. It treats especially the institution of slavery as it existed in the Southern States, the origin and growth of the abolition sentiment, the doctrine of states rights, and the development of the antagonism between the North and the South till its culmination in the Civil War. The lectures are supplemented by reports presented by the students upon assigned topics. One hour.

2. Russia and the Far East. The lectures of the first semester are devoted to Russia and discuss particularly the revolutionary movement, including the abuses of autocracy and bureaucracy, the character and methods of the revolutionists, the economic and political ability of the peasants, the widespread acceptance of socialism by the educated classes, the influence of the Church, and the recent reforms by the Stolypin ministry. The lectures of the second semester treat of the Far East, especially the rapid growth and the probable future of Siberia, the extent of the economic and social development of Japan, and its relations in international politics, the history and the present status of the struggle for the control of Manchuria, the recent religious revival in Korea and the problem of Japanese control of that country, the intellectual and political awakening in China, the character and the significance of the American experiment in the Philippines, the racial problem in Hawaii, and a consideration of missions in the Far East. One hour.

3. The Near East and Africa. This course is given in 1910-1911, and includes a discussion of the Balkan situation; the history, the achievements, and the problems of the Turkish Revolution; the extent and the significance of the political awakening and the religious revival through-

out the Mohammedan world; the history of the partitioning of Africa among the European powers; the character of European government in Africa, especially that of the Congo Free State; the results of the Boer war in British South Africa; the nationalist movement in Egypt and the successes and failures of the British administration; the achievements of the native races; and a study of the results and the methods of mission work. One hour.

4. Historical Seminar. The students in the Department of History meet once a week in a seminar for the consideration of particular topics of present interest. Each member is expected to present reports during the year, which then form the basis for a critical discussion. Some of the subjects presented in the past have treated of conditions in India, Tibet, The Congo Free State, Manchuria, Turkey, Russia in Asia, China, Japan, Korea, the Philippines and Egypt.

5. International Law. This is an advanced, elective course in the College, open to University students. Its aim is to give a general knowledge of International Law. Especial attention is given to the history and present status of arbitration, and to the proceedings and results of the Hague and London Conferences. A text-book is used, but the work is largely carried on by lectures, discussions, and the study of cases. Two hours.

6. United States History—National Period. This is an elective course in the College, covering the period from the formation of the constitution to the present time.

An especial effort is made to come to an accurate and sympathetic understanding of all sides of the great controversies of the period, particularly those in which the Southern States were involved. Students are expected to form independent judgments regarding the public men and the public questions of the times. The text-books are Hart's *Formation of the Union* and Wilson's *Division and Reunion*. The student's knowledge of these is tested by short written examinations, but the time in the class-room is taken up largely by lectures, and discussions of assigned readings. This general study, or its equivalent, is necessary as a preparation for Course 1. Two hours.

LIBRARY

The Library is under the control of a Library Committee, appointed by the Trustees, of which the President of the University is *ex officio* chairman. The duties of this committee are to advise concerning the arrangement, cataloguing, use of books, and other matters pertaining to the Library not reserved to the Trustees nor otherwise provided for.

Library Committee

President G. Stanley Hall, *Chairman*
President Edmund C. Sanford
Professor William E. Story, *Secretary*

Library Staff

Louis N. Wilson, *Librarian*

Assistants

Edith M. Baker, *Senior Assistant*
Helen J. Eliot, *Cataloguer*
Mary D. Thurston, *College Library*
Theodate L. Smith Bessie P. Sprague
Amelia W. Tyler

The Library building is situated on the corner of Main and Downing streets. The Public Opening of the new building was held January 14th, 1904. A full description of the building and of the Proceedings at the Opening will be found in the *Publications of the Clark University Library* for April, 1904 (Vol. 1, No. 3).

The College Library and study rooms occupy the lower floor of the new building, opened in September, 1910, and described in the College Record July, 1910, Vol. 5, pp. 185-187.

The Library contains about 55,000 bound volumes and pamphlets, and the reading-room receives over 400 journals.

The books are grouped as follows:

A Works of General reference
B Journals
C Mathematics
CD Math.-Physics
D Physics
DE Physical Chemistry
E Chemistry
F Biology, Zoölogy, Botany, Physiology, Neurology
G Geography
H Pathology
I Psychology
J Philosophy
K Religious Psychology
L Biography
M Anthropology
N Education
O General science
P History
Q Law
R Political and Social Science
S English
T Modern Languages
U Classics
W Practical Arts
X Library Science
Y Art
Z Manuscripts

Tuesday and Friday mornings, each week, all books recently added to the library are placed upon a table in the Reference section where they remain for three days. This affords the members of the University and College an opportunity to examine the new books in all departments before they are placed upon the shelves for circulation.

About once a month, during term, by the courtesy of our booksellers, new books are placed for inspection on one of the tables in the Reference section. Any member of the University or College may recommend the purchase for the library of books thus displayed, and such recommendation will receive prompt attention.

All books are classified by the heads of departments and particular attention is paid to the needs of students engaged in research work. The library already possesses a good collection of complete sets of the best scientific periodicals. It makes liberal purchases for individual needs and supplements these by drawing upon the resources of the older and larger libraries through the inter-library loan system. During the past year 420 volumes were borrowed from, and 316 volumes lent to, other libraries. The number of books added each year is about four thousand volumes.

The publications of the library, edited by the Librarian, and begun in October, 1903, are as follows:

VOL. I.

No. 1. WILSON, LOUIS N.
Bibliography of the Published Writings of President G. Stanley Hall. Oct. 1903

No. 2. WILSON, LOUIS N.
Bibliography of Child Study for the Year 1902. Jan. 1904

No. 3. Proceedings and Addresses at the Public Opening of the Library Building of Clark University, Thursday, January 14, 1904 Apr. 1904

No. 4. WILSON. LOUIS N.
Bibliography of Child Study for the Year 1903. July 1904

No. 5. WILSON, LOUIS N.
Preparing Manuscript for the Press. Jan. 1905

No. 6. Founder's Day, Clark University. Apr. 1905

No. 7. WILSON, LOUIS N.
Bibliography of Child Study for the Year 1904. July 1905

No. 8. DE PEROTT, JOSEPH
The Probable Source of the Plot of Shakespeare's Tempest. Oct. 1905

No. 9. Proceedings and Addresses at the Public Opening of the Art Department of Clark University. Dec. 1905

VOL. 2.

No. 1. List of Books and Pictures in the Clark Memorial Collection. July 1906

No. 2. WILSON, LOUIS N.
Bibliography of Child Study for the Year 1905. Oct. 1906

No. 3. WILSON, LOUIS N.
A few Titles in Child Study. Apr. 1907

No. 4. Proceedings at the First Annual Banquet of the New England Association of Alumni of Clark University, and at the Banquet of the Washington, D. C., Alumni Association, 1907. June 1907

No. 5. WILSON, LOUIS N.
Bibliography of Child Study for the Year 1906. Aug. 1907

No. 6. WILSON, LOUIS N.
Bibliography of Child Study for the Year 1907.
Sept. 1908

No. 7. MACLAURIN, RICHARD C.
The Outlook for Research (Founder's Day Address, Feb. 1, 1911.)
Mch. 1911

The department of religious psychology, established within the past few years has grown rapidly and supports *The American Journal of Religious Psychology and Education*, of which the fourth volume will soon be completed.

The books in the Art Department are accessible on application to the librarian, but, by the terms of the Founder's will, they cannot be taken from the building.

All the privileges of the library are open to all members of the University, and each member has direct access to every book and journal.

The library is open from 8 a.m. to 6 p.m. each week day from Sept. 1 to July 1. During July and August it is open from 8 a.m. to 5 p.m. from Mondays to Fridays, and on Saturdays from 8 a.m. to 12 m. The library is closed July 4th, Thanksgiving Day and Christmas Day.

Outside the University are found:

The Library of the American Antiquarian Society, organized in 1812, and containing over 120,000 volumes, accessible to all members of the University.

The Worcester Public Library, containing 600 newspapers and magazines and 175,000 volumes, has, in the past, to some extent supplemented the scientific publications purchased by the University, and all its privileges are accessible without charge.

The Library of the Worcester District Medical Society of about 10,000 volumes, is also free to all members of the University.

No loud talking is allowed in any part of the Library.

Every book shall be returned at the end of one calendar month from the time at which it was taken out, but may be called in at any time at the discretion of the Librarian.

Current numbers of periodicals shall not be taken out until they have been in the Library ten days.

All dictionaries, cyclopædias, and books of general reference are permanently reserved.

Reserved books and current numbers of periodicals, exempt from circulation, may be taken out after 5.30 p.m., but must be returned before 9 o'clock the next morning, excepting that such books and periodicals may be taken out Saturdays at 12 o'clock m., and may be kept until 9 o'clock the next Monday morning.

Readers must not write nor make any mark upon any book, manuscript, map, or other property belonging to the Library.

Any breach of the above Rules will involve suspension of the Library privileges until personally restored by the Librarian. All such cases shall be laid before the Library Committee at their next meeting.

ART DEPARTMENT

In his last will and testament the Founder of the University bequeathed

"the sum of $100,000, as an endowment fund for the Art Department of said University, and said sum is to be held and kept sacred and intact as a principal not to be used or expended under any conditions; but the income, interest or proceeds thereof shall be used only in putting and keeping said works of art or others given or obtained for said depart-

ment in good condition and in taking care of them; and then if there is a surplus of the income of said fund left, I will and direct that it be used in the purchase of additional works of art or of such matters as will add to the usefulness and efficiency of said Art Department."

Under these conditions a large room has been furnished and equipped on the upper floor of the Library Building. Upon the death of Mrs. Clark, those of the Founder's collections that were deemed most suitable for this purpose were arranged and displayed in this room, together with his most valuable books, which, by the conditions of the will, cannot be removed from the building. A complete catalogue of these books and paintings has been published in the PUBLICATIONS OF THE LIBRARY, Vol. 2, No. 1.

A Curator and Custodian have been appointed by the Board (see page 113) and all the collections are now accessible to visitors. The Art Department is open daily (except Sundays) from 9 a.m. to 5 p.m.

In 1909 there was added to the collection a large oil portrait of the late Carroll D. Wright, President of the Collegiate Department from 1902 to 1909. The painting is by Frederick P. Vinton of Boston and received the Temple Gold Medal at the 1909 Exhibition of the Pennsylvania Academy of the Fine Arts. Mr. Vinton is now at work upon a similar portrait of President G. Stanley Hall of the University, which he hopes to have completed before Commencement Day.

Scale models of the two new buildings and the University grounds have been made by T. J. McAuliffe and Son of Worcester, under the direction of the architects, Messrs. Frost, Briggs and Chamberlain.

REGULATIONS

1. All requisitions for apparatus must be made through the Bursar's office upon printed blanks provided for that purpose and signed by a member of the staff.

2. So far as possible, orders for only the kind and amount of apparatus certain to be used during the year shall be placed; nothing shall be ordered for future years, and apparatus for research shall take precedence over that for teaching and illustration only.

3. Requisitions for repairs, furniture, plumbing and work about the buildings must be made through the Bursar's office in writing and with detail, and, when once passed upon, no change involving additional expense can be made in the requisition without the consent of the Finance Committee.

4. No unappropriated rooms and no part of the University grounds shall be used for any purpose, and appropriated rooms shall not be used for other purposes than the stated University work for which they were intended, without previous permission from the office.

5. Unless for special reasons, absence of instructors from their stated exercises or from town for two consecutive week days in term time should be announced at the office, and for longer absence permission should be obtained beforehand.

6. The Trustees desire that no Instructor, Docent, or Fellow shall enter upon other engagements outside his proper work in the University of a kind or amount likely to lessen his full efficiency for science within the University.

7. Appropriations shall hereafter cover all apparatus and supplies of whatever nature for laboratories, for demonstration or illustration; all metal and carpenter work connected with the scientific activity of each department; and every form of special service. Appropriations, however, shall not hereafter cover books or journals, which shall be submitted to the Library Committee.

8. The several appropriations made to individual instructors and others shall be the full and fixed limit of the liability of the University, to be on no account transcended; and for every excess over the appropriations, from whatever cause, the instructor making the order shall be personally responsible.

9. No order for any purpose shall be paid by the University, whether on appropriations or for general supplies, that has not passed through the Bursar's office.

10. The President, Professors, Assistant Professors and regular Instructors authorized by the Board to do graduate work, together with the Librarian, shall constitute the Faculty of the University. Its meetings shall be called and presided over by its President, or, in his absence, by a Professor whom he shall designate. The Faculty shall elect a Secretary and its records shall always be accessible to the Trustees. Its jurisdiction shall include all matters pertaining to the instruction, conduct and discipline of students, and such other duties as may be prescribed by the Trustees.

11. The President of the University shall make, at the October meeting, an annual report on the condition of the departments and their work during the year and shall have authority to require and receive from all Instructors and Officers of the University and Library such reports as he may deem necessary. A copy of these reports, including that of the Library, shall be deposited with the Mayor of the City.

12. The University Faculty shall have the oversight of all graduate work and shall recommend for the Master's, Doctor's and all other graduate degrees upon such terms, conditions, and forms as it may determine, and exercise such other functions and responsibilities as are not expressly assigned to the Trustees or to the Collegiate Department.

13. The Custodian of the Art Collection shall have general oversight over its room in the Library Building and its contents, together with their care and use, under the direction and control of the Curator. The Curator shall from time to time submit to the Trustees his recommendations for the purchase of additional works of art from the income of the Art Fund, based on and together with the opinions of experts as to their value and desirability. All such purchases shall be approved by the Board of Trustees, or by such a committee of their members as they shall appoint for that purpose.

14. The President of the University shall make an annual report to the Trustees of the action of the Library Committee, of which he is Chairman, and this report, if approved, shall be filed and preserved.

DEGREES CONFERRED

On June 16, 1910, the University conferred degrees upon the following persons:

MASTER OF ARTS

George Myron Barrows
Thesis: The psychology of testimony.

George Davis Bivin
Thesis: The phylogenetic significance of religious conversion.

Marion Genevieve Boland
Thesis: Modern language teaching.

Harry Joseph Butler
Thesis: The stations of the cross: their history and psychology.

Thomas Charles Carrigan
Thesis: Juvenile delinquency in Worcester.

George Bernard Cashen
Thesis: History and psychology of the Jesuit missionaries in Japan.

Edward Walter Clare
Thesis: Manchuria: its history and present situation.

Maud Ethel Cochran
Thesis: The biology of the red-backed salamander (Plethodon cinereus, green).

Bertha Caroline Downing
Thesis: A contribution to the scientific study of the hand.

Amy Clendon Farlin

Thesis: The international relations between the United States and China.

Walter Seward Foley

Thesis: Heterogeneity of population as correlated with diversity of industries in Worcester and other Massachusetts cities.

Robert Hutchings Goddard

Thesis: On the theory of diffraction.

Louise Gulick

Thesis: Natural history of Heteropoda venatoria, Linn (or regia, Fabr).

Robert Singleton Hart

Thesis: A study of the decomposition of tertiary amyl acetate.

Percy Kendall Holmes

Thesis: Pedagogy and hygiene of the school period.

John Leroy Hughes

Thesis: Charities for children.

Arthur Wilder Kallom

Thesis: Studies in color and form discrimination of ringneck dove and homing pigeon.

Karl Johan Karlson

Thesis: The Swedish population of Worcester.

John Milton McIndoo

Thesis: Literature as a factor in education.

John Francis Roche

Thesis: Parks and playgrounds of Worcester.

Pauline Allis Smith

Thesis: The evolution of the government of the Ottoman empire.

Kazuwo Udo

Thesis: Credit as a factor in the power and operations of Wall Street.

Tadaichi Ueda

Thesis: The origin and growth of egoistic and altruistic sentiments in children.

Jessie Lillian Willis

Thesis: Government education in China.

Rudolph Acher
Dissertation: Psychology and hygiene of sex.

Harry Woodburn Chase
Dissertation: Psycho-analysis and the unconscious.

Elnora Whitman Curtis
Dissertation: The dramatic instinct in education.

Hobert Cutler Dickinson
Dissertation: Combustion calorimetry and the heats of combustion of cane sugar, benzoic acid and naphthalene.

William Trowbridge Merrifield Forbes
Dissertation: A structural study of some caterpillars.

Gordon Scott Fulcher
Dissertation: Experiments on the intensity of light from canal rays.

William Henry Holmes, Jr.
Dissertation: The adjustment of school organization to the needs of the individual child.

George Alexander Hutchinson
Dissertation: Psychology of symbolism.

Raymond Kurtz Morley
Dissertation: On the fundamental postulate of tamisage.

Thomas Lansing Porter
Dissertation: Experiments on a new dynamical method for the study of elastic hysteresis.

Leroy Walter Sackett
Dissertation: The Canada porcupine: a study of the learning process.

George Henry Steves
Dissertation: Industrial education of boys and girls.

John Howard Stoutemyer
Dissertation: A comparative study of mission methods.

Edward Ebenezer Weaver
Dissertation: Psycho-therapeutic evangelism.

The following gentlemen also have taken the examination for the doctor's degree, but have not yet completed all the formal requirements:

Eugene W. Bohannon A. Caswell Ellis

PUBLICATIONS

A Register and Official Announcement is issued each year in February or March.

In the years 1890, 1891, 1893, and 1902, the annual Report of the President to the Board of Trustees was printed.

A Summer School was held for nine years ending in 1903, and in such years a Summer School Programme was issued.

In July, 1899, the University observed its tenth anniversary, and published the following volume:

Clark University, 1889-1899. Decennial Celebration. 8 x 11 in., pp. 566. Published for the University. Price, $5.00. Contains the lectures delivered by Professors Picard, Boltzmann, Ramon y Cajal, Mosso and Forel at the Decennial Celebration, July, 1899; also reports by the heads of departments on their aims and ideals, with a list of past and present members of the University and the titles of their published papers.

Proceedings of the Child Conference for Research and Welfare. Conferences held at Clark University in the summers of 1909 and 1910. Vol. 1-1909, 257 p., contains 48 papers on problems relating to child welfare. Vol. 2-1910, 287 p., contains 34 papers, on similar subjects. The

papers in Vol. 1 were reprinted fron the Pedagogical Seminary for September and December 1909, but those in Vol. 2, with one exception, have not been printed elsewhere. Price $2.00 per volume in paper, $2.50 in cloth. Louis N. Wilson, Publisher, Worcester, Mass.

In connection with the celebration of the 20th anniversary of Clark University in September, 1909, conferences and lectures were held in the departments of Psychology and Education to which distinguished scientists and educators in this and other countries contributed. Lectures were given in Pedagogy and Psychiatry by Prof. Sigmund Freud of the University of Vienna and Dr. Carl C. Jung of the University of Zürich; in Psychology by Prof. William Stern of the University of Breslau, by Prof. E. B. Titchener of Cornell University, Prof. Franz Boas of Columbia University, Prof. H. S. Jennings of Johns Hopkins University, and Dr. Adolf Meyer of the Johns Hopkins Medical School; and in School Hygiene by Prof. Leo Burgerstein of the University of Vienna. The conferences in Psychology were presided over by Prof. Guy Montrose Whipple of Cornell University and Prof. Carl E. Seashore of the University of Iowa; and those in Education by Dr. Elmer Ellsworth Brown, U. S. Commissioner of Education, Prof. F. B. Dresslar of the University of Alabama, and Dr. Thomas A. Storey of the College of the City of New York. The lectures in Psychology, Education and School Hygiene and the papers presented at the Educational Conferences have been published in a volume entitled *Lectures and Addresses Delivered Before the Departments of Psychology and Pedagogy in Celebration of the 20th Anniversary of the Opening of Clark University.* Worcester, 1910.

Chemical Addresses: A collection of papers presented at the chemical conferences of the Second Decennial Celebration of Clark University. The collection is now (February

11, 1911,) in page-proof, the volume being published jointly by Clark University and the American Chemical Society. In organizing the conferences an effort was made to have all the more important branches of chemical research represented by competent lecturers. The collection includes:

1. Professor Marston Taylor Bogert, of Columbia University: *A Review of Some Recent Investigations in the Quinazoline Group.*

2. Professor John E. Bucher, of Brown University: *The Acids of the Phenyl-Propiolic Series and Their Condensation to Naphthalene Derivatives.*

3. Dr. André Debierne, of the University of Paris, France: *Review of Recent Progress in Radioactive Chemistry.*

4. Dr. C. S. Hudson, of the United States Department of Agriculture: *A Review of Discoveries on the Mutarotation of the Sugars.*

5. Dr. P. A. Levene, of the Rockefeller Institute of Medical Research: *Review of Recent Progress in Bio-Chemistry.*

6. Professor Arthur Michael, sometime Director of the Department of Chemistry in Clark University: *A Theory of Organic Chemistry Founded on the Law of Entropy.*

7. Professor S. P. Mulliken, of the Massachusetts Institute of Technology (formerly of Clark University): *Progress in Systematic Qualitative Organic Analysis.*

8. Professor William A. Noyes, of the University of Illinois: *Molecular Rearrangements of Carbon Compounds.*

9. Professor Theodore William Richards, of Harvard University: *Review of Recent Advances in Thermochemistry.*

10. Mr. Michael D. Sohon, of the Morris High School, New York: *Secondary School Chemistry: Method of Teaching It and Content of the Course.*

11. Professor Julius Stieglitz, of the University of Chicago (formerly of Clark University): *Catalysis, on the Basis of Work with Amido-Esters.*

12. Professor H. P. Talbot, of the Massachusetts Institute of Technology: *Correlation of the Chemical Courses in Secondary Schools and Colleges.*

13. Professor Edward W. Washburn, of the University of Illinois: *The Fundamental Law for a General Theory of Solutions.*

14. Dr. Willis R. Whitney, President of the American Chemical Society, Director of the Research Laboratories of the General Electric Company: *Organization of Industrial Research.*

15. Mr. Jesse E. Whitsit, of the De Witt Clinton High School, New York: *Secondary School Chemistry: Content of the the Course.*

The above papers have already been gradually published, partly in *Science*, but mostly in the *Journal of the American Chemical Society*. Further papers, presented at the Clark Celebration by Professor Wilder D. Bancroft, of Cornell University, Professor Gilbert Newton Lewis, of the Massachusetts Institute of Technology, and Professor James F. Norris, of Simmons College, could not be prepared for publication.

China and The Far East, pp. xxii 455, New York: T. Y. Crowell and Company, 1910, $2.00 net. This volume, edited by George H. Blakeslee, contains, in addition to the historical introduction by the editor, twenty-two of the addresses delivered during the Conference upon China and the Far East, which was held at Clark University, October, 1909, as one part of the Twentieth Anniversary Celebration of that year.

JOURNALS CONNECTED UNOFFICIALLY WITH THE DEPARTMENTS

The American Journal of Psychology. This journal was commenced in November, 1887, and is now edited by G. Stanley Hall, E. C. Sanford, E. B. Titchener (Cornell University), and J. W. Baird, with the assistance of an international board of co-operators. Each volume contains four numbers—issued in January, April, July and October. Besides original articles, a considerable portion of its space is devoted to careful digests of the important literature in its field. Price $5 per volume; single numbers, $1.50. Florence Chandler, Publisher, Worcester, Mass.

THE PEDAGOGICAL SEMINARY. This journal was begun in January, 1891, and is edited by the President of the University with the assistance of William H. Burnham, Professor of Pedagogy. It is an international record of educational literature, institutions and progress, and is devoted solely to the highest interest of education in all grades, with digests of important literature of all countries. It is the organ of the Educational Department of the University. Each volume contains four numbers—issued in March, June, September and December. Price $5 per volume; single numbers, $1.50. Florence Chandler, Publisher, Worcester, Mass.

THE AMERICAN JOURNAL OF RELIGIOUS PSYCHOLOGY AND EDUCATION. This journal was begun in May, 1904, and three numbers constitute a volume. It aims to give an account of all the more important books and periodicals in its field, which includes religious education, and publishes original articles. Each number contains about 100 pages. Price $3.50 per volume; $1.50 per number. Louis N. Wilson, Publisher, Worcester, Mass.

THE JOURNAL OF RACE DEVELOPMENT. This journal was begun in July 1910 and is edited by Dr. Blakeslee and President Hall with the coöperation of a board of sixteen contributing editors. It offers itself as a forum for the discussion of the problems which relate to the progress of races and states generally considered backward in their standard of civilization. Issued quarterly, each number containing about 125 pages. Price $2.00 per volume; 50 cts. per number. Louis N. Wilson, Publisher, Worcester, Mass.

CLARK UNIVERSITY

WORCESTER, MASSACHUSETTS

REGISTER AND TWENTY-FOURTH OFFICIAL ANNOUNCEMENT

WORCESTER, MASSACHUSETTS
Published for the University
March, 1912

BOARD OF TRUSTEES

A. George Bullock
Orlando W. Norcross
Francis H. Dewey
Arthur F. Estabrook
Herbert Parker
Lucius Tuttle
Austin S. Garver
Arthur P. Rugg

OFFICERS

President . . .	A. George Bullock
Vice-President and Treasurer	Francis H. Dewey
Secretary . . .	G. Stanley Hall

COMMITTEES

Finance

A. George Bullock
Francis H. Dewey
Arthur F. Estabrook

Buildings

Orlando W. Norcross

CALENDAR 1912–1913

1912		
April 1	Monday	Spring Recess
April 6	Saturday	
April 19	Friday	Patriots' Day
May 30	Thursday	Memorial Day
June 20	Thursday	Twenty-third academic year closes

Summer Vacation of 14 Weeks

Sept. 26	Thursday	Twenty-fourth academic year begins
Oct. 12	Saturday	Columbus Day
Nov. 28	Thursday	Thanksgiving Day
Dec. 23	Monday	Christmas Recess
1913		
Jan. 4	Saturday	
Feb. 1	Saturday	Founder's Day*
Feb. 22	Saturday	Washington's Birthday
April 7	Monday	Spring Recess
April 12	Saturday	
April 19	Saturday	Patriots' Day
May 30	Friday	Memorial Day
June 19	Thursday	Twenty-fourth academic year closes

*Not a holiday

MEMBERS

STAFF

GRANVILLE STANLEY HALL, PH.D., LL.D. 94 Woodland St.
President of the University and Professor of Psychology

A.B., Williams College, 1867; A.M., 1870; Ph.D., Harvard University, 1878; Lecturer in Harvard and Williams Colleges, 1880–81; Professor of Psychology, Johns Hopkins University, 1881–88; President and Professor of Psychology, Clark University, 1888–; LL.D., University of Michigan, 1888, Williams College, 1889, and Johns Hopkins University, 1902; Chairman of the Library Committee and Curator of the Art Collection, Clark University. Resident Member of the Massachusetts Historical Society.

WILLIAM EDWARD STORY, PH.D. 17 Hammond St.
Professor of Mathematics and Secretary of the Faculty

A.B., Harvard University, 1871; Ph.D., University of Leipzig, 1875; Parker Fellow (Harvard), 1874–75; Tutor of Mathematics, Harvard University, 1875–76; Associate, Assistant Professor, and Associate Professor of Mathematics, Johns Hopkins University, 1876–89; Professor of Mathematics, Clark University, 1889–; Professor of Mathematics, Clark College, 1902–07. Member of the National Academy of Sciences; Member of the London Mathematical Society; Resident Fellow of the American Academy of Arts and Sciences.

EDMUND CLARK SANFORD, PH.D., SC.D.
Lecturer on College Administration 96 Woodland St.

A.B., University of California, 1883; Fellow, Johns Hopkins University, 1887; Ph.D., Johns Hopkins University, 1888; Instructor in Psychology, Johns Hopkins University, 1888; Instructor in Psychology, Clark University, 1889-92; Assistant Professor, 1892–1900; Professor of Psychology, Clark College, 1903–07; Professor of Experimental and Comparative Psychology, Clark University, 1900–09; Lecturer, 1909–; Sc.D., Hobart College, 1909; President of Clark College, 1909–.

ARTHUR GORDON WEBSTER, PH.D., SC.D., LL.D.
Professor of Physics 66 West St.

A.B., Harvard University, 1885; Instructor in Mathematics, Harvard University, 1885–86; Parker Fellow, 1886–89; Student, Universities of Berlin, Paris, Stockholm, 1886–90; Ph.D., University of Berlin, 1890; Docent in Physics, Clark University, 1890–92; Assistant Professor, 1892–1900; Professor, 1900–; Professor of Physics, Clark

College, 1902–07; Director of Physical Laboratories; Sc.D., Tufts College, 1905; LL.D., Hobart College, 1908. Member of the National Academy of Sciences; Resident Fellow of the American Academy of Arts and Sciences; Member of the American Philosophical Society.

HENRY TABER, PH.D.

Professor of Mathematics — 65 West St.

Ph.B., Yale University, 1882; Ph.D., Johns Hopkins University, 1888; Assistant in Mathematics, Johns Hopkins University, 1888–89; Docent in Mathematics, Clark University, 1889–92; Assistant Professor, 1892–1903; Professor, 1903–; Member of the London Mathematical Society; Resident Fellow of the American Academy of Arts and Sciences.

CLIFTON FREMONT HODGE, PH.D.

Professor of Biology — 103 May St.

A.B., Ripon College, 1882; Fellow in Biology, Johns Hopkins University, 1888–89; Ph.D., Johns Hopkins University, 1889; Fellow in Psychology and Assistant in Neurology, Clark University, 1889–91; Instructor in Biology, University of Wisconsin, 1891–92; Assistant Professor of Physiology and Neurology, Clark University, 1891–1906; Professor of Biology, 1906–; Professor of Biology, Clark College, 1902–.

WILLIAM HENRY BURNHAM, PH.D.

Professor of Pedagogy and School Hygiene — 17 Circuit Ave.

A.B., Harvard University, 1882; Instructor in Wittenberg College, 1882–83; Instructor, State Normal School, Potsdam, N. Y., 1883–85; Fellow Johns Hopkins University, 1885–86, Ph.D., 1888, and Instructor in Psychology, 1888–89; Docent in Pedagogy, Clark University, 1890–92; Instructor, 1892–1900; Assistant Professor, 1900–06; Professor, 1906–.

ALEXANDER FRANCIS CHAMBERLAIN, PH.D.

Professor of Anthropology — 19 Baker St.

B.A., University of Toronto, 1886; M.A., 1889; Fellow in Modern Languages, University College, Toronto, 1887–90; Librarian, Canadian Institute, Toronto, 1889–90; Fellow in Anthropology, Clark University, 1890–92; Ph.D., Clark University, 1892; Lecturer in Anthropology, Clark University, 1892–1900; Acting Assistant Professor, 1900–04; Assistant Professor, 1904–11; Professor, 1911–; Editor, *Journal of American Folk-Lore*, 1900–1907; Co-editor, *Journal of Religious Psychology*, 1911–; Corresponding Member O Instituto de Coimbra, Portugal; Member of the American Antiquarian Society; Honorary Member American Folk-Lore Society; Fellow American Ethnological Society; Contributor to *Encyclopedia Britannica* (11th Ed.).

MARTIN ANDRE ROSANOFF, SC.D.

Professor of Chemistry — 7 Downing St.

Ph.B., New York University, 1895; Sc.D., 1908; Student, University of Berlin, 1895–96; University of Paris, 1896–98; Research Fellow, New York University, 1899–1900; Instructor in Theoretical Chemistry, New York University, 1904–05; Assist-

ant Professor of Chemistry, 1905–07; Assistant Professor of Chemistry, Clark University, 1907–11; Professor, 1911–; Assistant Professor of Organic Chemistry, Clark College, 1907–10; Professor, 1910–; Director of Chemical Laboratories; Fellow of the American Association for the Advancement of Science; Nichols Medalist of the American Chemical Society.

GEORGE HUBBARD BLAKESLEE, PH.D.
Professor of History — 24 Richards St.

A.B., Wesleyan University, 1893; A.M., Harvard University, 1899; Ph.D., 1903; Student, Johns Hopkins University, 1893–94; Parker Fellow, Harvard, 1901–02; Student, Universities of Berlin, Leipzig, and Oxford, 1901–03; Instructor in History, Clark College, 1903–04; Assistant Professor, 1904–09; Professor, 1909–; Instructor in History, Clark University, 1905–11; Professor, 1911–.

JOHN WALLACE BAIRD, PH.D. — 17 Circuit Ave.
Assistant Professor of Experimental Psychology

A.B., University of Toronto, 1897; Student, University of Leipzig, 1898–99; Fellow, University of Wisconsin, 1899–1901; Fellow, Cornell University, 1901–02; Ph.D., 1902; Assistant in Psychology, 1902–03; Carnegie Research Assistant, 1903–04; Instructor in Psychology, Johns Hopkins University, 1904–06; Instructor in Psychology, University of Illinois, 1906–07; Assistant Professor, 1907–February, 1910; Assistant Professor of Experimental Psychology, Clark University, February, 1910–.

JOSEPH DE PEROTT
Lecturer in Mathematics — 5 Hawthorn St.

Student, Universities of Paris and Berlin, 1877–80; Docent in Mathematics, Clark University, 1890–1904; Lecturer, 1904–.

LOUIS N. WILSON, LITT.D. — 11 Shirley St.
Librarian of the University and Custodian of the Art Collection

Litt.D., Tufts College, 1905.

BENJAMIN SHORES MERIGOLD, PH.D.
Instructor in Chemistry — 35 Irving St.

A.B., Harvard University, 1896; A.M., 1897; Ph.D., 1901; Assistant in Chemistry, Harvard University, 1896–1900; Instructor in Chemistry, Worcester Polytechnic Institute, 1900–03; Assistant Professor of Chemistry, Clark College, 1903–08; Professor, 1908–; Instructor in Chemistry, Clark University, 1905–.

FRANK HAMILTON HANKINS, PH.D.
Instructor in Economics and Sociology — 4 Cabot St.

A.B., Baker University, 1901; Student, Columbia University, 1903–1904; Scholar in Sociology, 1904–1905; Fellow in Statistics, 1905–1906; Student, 1907–08; Ph.D., Columbia University, 1908; Instructor in Economics, Clark College, 1906–07; Assistant Professor, 1908–; Instructor in Economics and Sociology, Clark University, 1906–07; 1908–.

JOHN CHARLES HUBBARD, PH.D.

Instructor in Physics — 8 Loudon St.

B. S., University of Colorado, 1901; Scholar in Physics, Clark University, and Assistant to Professor Webster, 1901–02; Fellow, 1902–04; Ph. D., Clark University, 1904; Instructor in Physics, Simmons College, 1904-05; Asssistant Professor of Physics, New York University, 1905–06; Assistant Professor of Physics, Clark College, 1906–11; Professor, 1911–; Honorary Fellow in Physics, Clark University, 1907–09; Instructor, 1910–.

JAMES PERTICE PORTER, PH.D.

Instructor in Psychology — 209 Lovell St.

A.B., Indiana University, 1898; A.M., 1901; Instructor in Psychology, Indiana University, 1900–03; In Charge of Work in Neurology, Indiana University Biological Station, 1891 and 1903; Honorary Fellow in Psychology, Clark University, 1903–09; Ph.D., Clark University, 1906; Instructor in Psychology, Clark College, 1903–07; Assistant Professor, 1907–09; Assistant Professor and Dean, 1909–; Lecturer in Psychology, Clark University, February–June, 1910; Instructor, 1910–.

FRANK BLAIR WILLIAMS, PH.D.

Instructor in Mathematics — 2 Isabella St.

C.E., University of Missouri, 1890; M. S., 1893; Engineering Work with the Mississippi River Commission, 1890–92; Teaching Fellow in Mathematics, University of Missouri, 1892–93; Survey Work with the Mississipi River Commission, 1894–95; United States Assistant Engineer in Tennessee River Improvement, 1895–97; Scholar in Mathematics, Clark University, 1897–98; Fellow, 1898–1900; Ph.D., 1900; Assistant Professor of Civil Engineering, Union College, 1900–05; Assistant Professor of Engineering and Mathematics, 1905–06; Professor of Engineering Mathematics, 1906–07; Assistant Professor of Mathematics, Clark College, 1907–08; Professor, 1908–; Honorary Fellow in Mathematics, Clark University, 1909–10; Instructor, 1910–.

ANNUAL APPOINTMENTS

EDWARD COWLES, M.D., LL.D., Boston

Non-Resident Lecturer in Psychiatry

A.B., Dartmouth College, 1859; A.M., 1863; Medical House Pupil, Retreat for the Insane, Hartford, Conn., 1860–62; M.D., Dartmouth Medical School, 1863; M.D., College of Physicians and Surgeons, New York, 1863; Medical Corps, United States Army, 1863–72; Resident Physician and Superintendent, Boston City Hospital, 1872–79; Medical Superintendent, McLean Hospital, Waverley, Mass., 1879–1903; Lecturer on Mental Diseases, Dartmouth Medical School, 1885–86; Professor of Mental Diseases, 1886–; Fellow by Courtesy, Johns Hopkins University, 1887-88; Clinical Instructor in Mental Diseases, Harvard Medical School, 1888–; LL.D., Dartmouth College, 1890; Non-Resident Lecturer in Psychiatry, Clark University, 1903–.

ARTHUR AMOS NOYES, PH.D., SC.D., LL.D., Boston
Non-Resident Lecturer in Chemical Research

S.B., Massachusetts Institute of Technology, 1886; S.M., 1887; Ph.D., University of Leipzig, 1890; Assistant and Instructor in Chemistry, Massachusetts Institute of Technology, 1887–88 and 1890–94; Assistant Professor, 1894–99; Professor and Director of the Research Laboratory of Physical Chemistry, 1899–; Non-Resident Lecturer in Chemical Research, Clark University, 1910–. Member of the National Academy of Sciences.

ROBERT KENNEDY DUNCAN, A.B., Pittsburgh, Pennsylvania
Non-Resident Lecturer in Industrial Chemical Research

A.B., University of Toronto, 1892; Fellow in Chemistry, Clark University, 1892–93; Graduate Student, Columbia University, 1897–98; Professor of Chemistry, Washington and Jefferson College, 1901–06; Professor of Industrial Chemistry, University of Kansas, 1906–; Director of Industrial Research, 1910–; Professor of Industrial Chemistry and Director of Industrial Research, University of Pittsburgh, 1910–.

SAMUEL PAUL CAPEN, PH.D.
Lecturer on School Administration 9 Downing St.

A.B., A.M., Tufts College, 1898; A.M., Harvard University, 1900; Ph.D., University of Pennsylvania, 1902; Harrison Fellow in Germanic Languages, University of Pennsylvania, 1900–01; Graduate Student, on leave of absence, 1901–02; Student, University of Leipzig, 1901–02; Instructor in Modern Languages, Clark College, 1902–03; Assistant Professor, 1903–08; Professor, 1908–.

JOHN MADISON FLETCHER, A.M., Nashville, Tennessee
Lecturer in the Children's Institute 17 Isabella St.

A.B., Vanderbilt University, 1901; A.M., University of Colorado, 1904; Assistant in Education, 1905–06; Assistant in Philosophy, Leland Stanford, Jr., University, 1909–10; Fellow in Psychology, Clark University, 1910–11.

NEWTON MILLER, PH.D., Thorntown, Indiana
Lecturer on Heredity 7 Shirley Terrace

A.B., Indiana University, 1905; A.M., 1906; Fellow in Biology, Clark University 1906–08; Ph.D., 1908; Instructor in Biology, Clark College, 1908–; Honorary Fellow in Biology, Clark University, 1908–10.

THEODATE L. SMITH, PH.D. 23 Maywood St.
Lecturer and Librarian in the Children's Institute

A.B., Smith College, 1882; A.M., 1884; Student, Yale University, 1893–95; Special Student, Clark University, 1895–96; Ph.D.,Yale University, 1896; Cornell University, 1900; Assistant to President Hall in research work under Carnegie grant, Clark University, 1902–04; Estabrook grant, October, 1904–February, 1905; Berlin University, April–August, 1905; Research Assistant to President Hall,Clark University, 1905–09; Lecturer and Librarian in the Children's Institute, 1909–.

AMY ELIZA TANNER, PH.D., Faribault, Minnesota
Lecturer in the Children's Institute and Research Assistant to Dr. Hall — 90 Florence St.

A.B., University of Michigan, 1893; Scholar, University of Chicago, 1894–95; Fellow, 1895–98; Ph.D., University of Chicago, 1898; Associate in Philosophy, 1898–1902; Professor of Philosophy, Wilson College, 1903–07; Honorary Fellow in Psychology, Clark University, 1907–09; Lecturer in the Children's Institute, 1909–.

WILLIAM HOMER WARREN, PH.D.
University Docent in Chemistry — 974 Main St.

A.B., Harvard University, 1889; A.M., 1891; Ph.D., 1892; Assistant in Chemistry, Harvard University, 1890–91; Instructor in Chemistry, Medical Department, Washington University, 1898–99; Assistant Professor, 1899–1900; Professor, 1900–11; Dean, 1908–10; Assistant Professor of Chemistry, Clark College, 1911–.

HARRY PORTER WELD, PH.D.
Instructor in Psychology — 11 Benefit St.

Ph.B., Ohio State University, 1900; Graduate in Music, Denison University, 1900; Professor of Music, Peabody College for Teachers, University of Nashville, 1900–10; Fellow in Psychology, Clark University, 1909–11; Research Assistant to Dr. Baird, 1910–11; Ph.D., 1911; Instructor in Psychology, 1911–; Assistant in Psychology, Clark College, 1911–.

HONORARY FELLOWS

LEONARD ANDERSON BLUE, PH.D.
Honorary Fellow in Pedagogy — 7 Lowell St.

Ph.B., Cornell College, 1892; Ph.M., 1893; Professor of Philosophy and Social Sciences, Iowa Wesleyan University, 1898–1900; Fellow in Political Science, University of Pennsylvania, 1900–01; Ph.D., 1902; Professor of English, Morningside College, 1902–05; Professor of Education, Goucher College, 1909–11; Fellow by Courtesy, Johns Hopkins University, 1910–11.

JAMES ATKINS BULLARD, A.B.
Honorary Fellow in Mathematics — 18 Walnut St.

A.B., Williams College, 1908; Instructor in Mathematics, Worcester Polytechnic Institute, 1908–; Student in Mathematics, Clark University, 1908–11.

ARTHUR DEXTER BUTTERFIELD, A.M.
Honorary Fellow in Mathematics — 10 Schussler Road

B.S., Worcester Polytechnic Institute, 1893; M.S., 1898; A.M., Columbia University, 1904; Instructor in Civil Engineering, Worcester Polytechnic Institute, 1894–98; Instructor in Mathematics, Engineering Department, University of Vermont, 1898–1900; Assistant Professor, 1900–04; Professor of Mathematics and Mechanics, 1904–

08; Assistant Professor of Mathematics, Worcester Polytechnic Institute, 1908–10; Professor, 1910–; Student in Physics and Mathematics, Clark University, 1908–09; Honorary Fellow in Mathematics, 1909–.

ELNORA WHITMAN CURTIS, PH.D.
Honorary Fellow in Psychology — Burncoat St.

A.B., Smith College, 1892; Scholar in Psychology, Clark University, 1907–08; A.M., 1908; Honorary Fellow in Psychology, 1908–; Ph.D., 1910.

IRVING ANGELL FIELD, B.S., Granville, Ohio
Honorary Fellow in Biology — 5 Enfield St.

B.S., Denison University, 1903; Instructor in Ornithology, 1902–03; Assistant in Zoology, Harvard University, 1903–05; Austin Teaching Fellow, 1905–06; Professor of Chemistry and Biology, Western Maryland College, 1906–11; Instructor in Biology, Clark College, 1911–.

WILLIAM TROWBRIDGE MERRIFIELD FORBES, PH.D.
Honorary Fellow in Biology — 23 Trowbridge Road

A.B., Amherst College, 1906; Instructor in Biology, Robert College, Constantinople, Turkey, 1906–08; Graduate Student, Cornell University, 1908–09; Fellow in Biology, Clark University, 1909–10; Ph.D., 1910; Instructor in Biology, Rutgers College, 1910–11.

ROBERT HUTCHINGS GODDARD, PH.D.
Honorary Fellow in Physics — 1 Maple Hill

B.S., Worcester Polytechnic Institute, 1908; Instructor in Physics, 1908–09; Student in Physics, Clark University, 1908–09; Fellow in Physics, 1909–11; A.M., 1910; Ph.D., 1911.

CAREY EYSTER MELVILLE, A.B.
Honorary Fellow in Mathematics — 3 Ferdinand St.

A.B., Northwestern University, 1901; Fellow in Mathematics, 1901–02; Graduate Student in Mathematics, Johns Hopkins University, 1902–03; Instructor in Mathematics, Case School of Applied Science, 1903–06; Honorary Fellow in Mathematics, Clark University, 1906–; Assistant in Mathematics, Clark College, 1906–09; Instructor, 1909–10; Instructor in Mathematics and Physics, 1910–11; Assistant Professor, 1911–.

WALTER FRANKLIN ROBIE, M.D., Baldwinville
Honorary Fellow in Psychology and Biology — 105 P easant St.

A.B., Dartmouth College, 1889; M.D., Dartmouth Medical School, 1893; Assistant Physician, Hospital Cottages, 1892–94; Supt. Riverview Sanitarium, 1902-07; Pine Terrace Sanitarium, 1907–; Student in Psychology and Biology, Clark University, 1904–05; Honorary Fellow, 1905–.

LEROY WALTER SACKETT, PH.D.

Honorary Fellow in Psychology — 28 Downing St.

A.B., Central Normal College, 1906; A.B., Indiana University, 1908; A.M., 1909; Fellow in Psychology, Clark University, 1908–10; Ph.D., 1910; Head of Training Department, Northwestern State Normal School, Edinboro, Pa.; 1910–11; Honorary Fellow in Psychology, Clark University, September, 1911–January, 1912.

JAMES SALVADOR VAN TESLAAR, M.D.

Honorary Fellow in Biology — 28 Downing St.

B.L., University of California, 1902; M.D., College of Physicians and Surgeons, San Francisco, 1903; Instructor in Medical Latin, Biology and Chemistry, 1901–03; Research Fellow in Anatomy (Neurology) and Assistant in Histology, University of Chicago, 1903–04; Topical Lecturer on History of Medicine, Mental Hygiene and Physiology, 1904–07; Professor of Pathology and Bacteriology, Bennett Medical College, 1907–08; Director of Clinical Laboratories, Jefferson Park Hospital and American Hospital, Chicago, 1907–10; Graduate Student, University of Michigan, 1910–11.

FELLOWS

ARTHUR KENNEDY BEIK, PED. M., Wapello, Iowa

Fellow in Pedagogy — 20 Richards St.

Ph.B., Grinnell College, 1908; Ped.M., School of Pedagogy, New York University, 1909.

GEORGE DAVIS BIVIN, A.M.

Fellow in Psychology — 7 Shirley Terrace

A.B., Clark College, 1909; Scholar in Psychology, Clark University, 1909–10; A.M., 1910; Fellow, 1910–.

ERWIN OLIVER FINKENBINDER, A.M., Kent, Illinois — 900 Main St.

Fellow in Psychology and Research Assistant to Dr. Baird

Graduate, Northern Illinois State Normal School, 1908; A.B., University of Illinois, 1910; Fellow in Psychology, Clark University, 1910–; A.M., 1911.

SARA CAROLYN FISHER, A.M., Galesburg, Illinois

Fellow in Psychology — 2 Woodbine St.

A.B., Lombard College, 1909; A.M., University of Illinois, 1910; Fellow in Psychology, Clark University, 1910–.

ARTHUR OLIN GRIGGS, PH.B., Westford, Connecticut

Fellow in Pedagogy — 87 Woodland St.

Ph.B., Wesleyan University, 1898; Professor of Mathematics, Virginia Union University, 1903–05; Scholar in Pedagogy, Clark University, 1906–07; 1910–11.

MERRITT ROY GROSE, S.B., Findlay, Ohio
Fellow in Chemistry — 34 Gates St.

A.B., Findlay College, 1905; S.B., University of Chicago, 1907; Professor of Chemistry and Physics, Findlay College, 1907–11; Assistant in Chemistry, Clark College, 1911–.

ERNEST HAMMOND, A.M., Milan, Ohio
Fellow in Pedagogy — 7 Clifton St.

Pd.B., Ohio University, 1910; Scholar in Pedagogy, Clark University, 1910–11; A.M., 1911.

ROBERT SINGLETON HART, JR.* A.M., Pisgah, Kentucky
Fellow in Chemistry

A.B., State University of Kentucky, 1907; B.S., 1909; Fellow in Chemistry, Clark University, 1909–; A.M., 1910; Assistant in Chemistry, Clark College, 1910–11.

FRANK EUGENE HOWARD, A.M., Ann Arbor, Michigan
Fellow in Psychology — 101 May St.

Pd.B., Michigan State Normal College, 1907; A.B., 1910; Fellow in Psychology, Clark University, 1910–; A.M., 1911.

ARTHUR TABER JONES, B.S.
Fellow in Physics — 9 Ripley St.

B.S., University of Chicago, 1899; Graduate Scholar in Physics, University of Chicago, 1899–1900; Assistant in Physics, Purdue University, 1902–03; Instructor, 1903–06; Assistant Professor, 1906–11.

KARL JOHAN KARLSON, A.M., Myresjo, Sweden
Fellow in Psychology — 6 Wyman St.

A.B., Clark College, 1909; Scholar in Psychology, Clark University, 1909–10; A.M., 1910; Fellow, 1910–.

ADELBERT LLEWELLYN LEATHERS, PH.B., Orrington, Maine
Fellow in Biology — 24 Beaver St.

Ph.B., Wesleyan University, 1907; Graduate Student, University of Michigan, 1907–08; Cornell University, Sept., 1908–Feb., 1909; Professor of Biology, Leander Clark College, 1909–10.

JOHN MILTON MCINDOO, A.M., Broken Bow, Nebraska
Fellow in Pedagogy — 58 Woodland St.

A.B., Antioch College, 1900; Instructor in English, Antioch College, 1899–1900; Instructor in Psychology and Pedagogy, Chattanooga Normal School, 1900–01;

*Non-resident during part of the year on account of illness.

Instructor in Psychology and Pedagogy, Northern Illinois Normal School, 1901–03; Instructor in Pedagogy and English, Junior State Normal School, Broken Bow, Neb., 1906–09; Scholar in Pedagogy, Clark University, 1909–10; A.M., 1910; Fellow, 1910–.

ABRAHAM MANDELSTAM, A.B., New York City
Fellow in Pedagogy — 8 Lowell St.

A.B., College of the City of New York, 1903; Graduate Student, New York University, 1907–08.

FREDERICK THOMAS MAYER-OAKES, PH.D., Penalosa, Kansas
Fellow in Anthropology — Berlin

A.B., Dexter College, 1905; A.M., Leander Clark College, 1908; B.D., Kansas City University, 1909; Graduate Student in Anthropology, Yale University, 1909–10; Ph.D., Kansas City University, 1910; Scholar in Anthropology, Clark University, 1910–11; A.M., 1911.

HERMAN MONROE POTTER, A.B., Madison, Wisconsin
Fellow in Chemistry — 8 Loudon St.

A.B., University of Wisconsin, 1906; Instructor in Chemistry, Michigan Agricultural College, 1909–11; Assistant in Chemistry, Clark College; 1911–.

WALLACE FRANK POWERS, A.M., Spencer
Fellow in Physics — 38 Maywood St.

A.B., Clark College, 1910; Assistant in Physics, 1910–; Scholar in Physics, Clark University, 1910–11; A.M., 1911.

ROY FRANKLIN RICHARDSON, A.B., Emporia, Kansas
Fellow in Psychology — 7 Fairfield St.

A.B., Kansas Normal College, 1909; Fellow in Psychology, Clark University, 1910–.

KIRKMAN KENSON ROBINSON, A.M., Wilderville, Oregon
Fellow in Psychology — 9 Fairfield St.

A.B., University of Oregon, 1907; A.M., 1908; Scholar in Psychology, Clark University, 1910–11.

BARBARA ELISABETH ROETHLEIN, A.M., Bamberg, Germany
Fellow in Psychology — 2 Woodbine St.

Lehrerinnenexamen in Bamberg am kgl. Lehrerseminar, 1908; Student in Psychology, Clark University, 1909–10; Scholar, 1910–11; A.M., 1911; Fellow, Sept.–Dec., 1911.

JOHN FREDERIC WILLIAM SCHULZE, B.S., New York City
Fellow in Chemistry and Research Assistant to Dr. Rosanoff — 6 Charlotte St.

B.S., New York University, 1911.

ADELE ADAMS STEELE, A.M., Columbia, Missouri
Fellow in Pedagogy — 41 Clifton St.

A.B., Potter College, 1907; Principal, Normal Department, Western Union College, 1909–10; Scholar in Pedagogy, Clark University, 1910–11; A.M., 1911.

ASA GEORGE STEELE, LL.D., Columbia, Missouri
Fellow in Psychology — 41 Clifton St.

B.S., University of Missouri, 1901; Professor of Physics and Chemistry, University of Chattanooga, 1904–05; Professor of Sciences, Ogden College, 1906–07; President, Clarksville College, 1907–08; LL.D., Bowdon College, 1908; Professor of Mathematics and Sciences, Western Union College, 1908–10; Fellow in Psychology, Clark University, 1910–; A.M., 1911.

HAROLD FREDERIC STIMSON, A.M., Rochdale — 38 Maywood St.
Fellow in Physics and Research Assistant to Dr. Webster

A.B., Clark College, 1910; Scholar in Physics, Clark University, 1910–11; A.M., 1911.

TADAÏCHI UEDA, A.M., Kyoto, Japan
Fellow in Psychology — 32 Lovell St.

Graduate, Doshisha Theological Seminary, Kyoto, Japan, 1907; Student, Union Theological Seminary, 1907–08; Fellow in Psychology, Clark University, 1909; A.M., 1910.

MIRIAM VAN WATERS, A.M., Portland, Oregon
Fellow in Psychology — 6 Freeland St.

A.B., University of Oregon, 1908; A.M., 1910; Fellow in Psychology, Clark University, 1910–.

IDA KIRTLEY WOOD, A.M., Horse Cave, Kentucky
Fellow in Psychology — 17 Isabella St.

B.S., Lebanon University, Ohio, 1892; Fellow in Psychology, Clark University, 1910–; A.M., 1911.

MOSES EDWIN WOOD, A.M., Horse Cave, Kentucky
Fellow in Psychology — 17 Isabella St.

A.B., Lebanon University, Ohio, 1894; Fellow in Psychology, Clark University, 1910–; A.M., 1911.

ELIZABETH LINDLEY WOODS, A.M., Portland, Oregon
Fellow in Psychology — 6 Freeland St.

A.B., University of Oregon, 1905; Assistant Instructor in English Literature, 1905–06; A.M., 1910; Scholar in Psychology, Clark University, 1910–11.

Sohichi Yamada, A.M., Shizuoka, Japan
Fellow in Pedagogy — 2 Oliver St.

Graduate, Aoyama College, Tokyo, Japan, 1906; A.B., De Pauw University, 1910; Fellow in Pedagogy, Clark University, 1910–; A.M., 1911.

Elias Yanovsky, St. Petersburg, Russia
Fellow in Chemistry — 24 Beaver St.

Graduate, University of St. Petersburg, 1911.

Scholars

Ivy Gertrude Campbell, A.B., Malvern, Iowa
Scholar in Psychology — 5 Oliver St.

A.B., University of Colorado, 1911.

Katherine Ella Dolbear, Arlington
Scholar in Biology — 87 Woodland St.

Student, Tufts College, 1893–95; 1900–01; Massachusetts Institute of Technology, 1896–97; Clark University, 1901–02.

Merton Taylor Goodrich, B.S., Bingham, Maine
Scholar in Mathematics — 101 May St.

B.S., University of Maine, 1909.

Helen Barnard Green, A.B.
Scholar in Mathematics — 126 Burncoat St.

A.B., Boston University, 1910.

Samuel Winfield Hirsch, A.B.
Scholar in History — 9 Pelham St.

A.B.. Clark College, 1911.

Joshua Allen Hunter, Ph.D., Tyrone, Pennsylvania
Scholar in Pedagogy — 8 Piedmont St.

A.B., Pennsylvania State College, 1905; Instructor in Latin, State Normal School, Millersville, Pa., 1905–06; Graduate Student, Yale University, 1906–07; Instructor in Psychology and Pedagogy, State Normal School, Millersville, Pa., 1907–11; A.M., Pennsylvania State College, 1908; Ph.D., Kansas City University, 1909.

Harry Louis Jackson, A.B.
Scholar in Economics — 61 Providence St.

A.B., Clark College, 1911.

SAKYO KANDA, A.M., Tokyo, Japan
Scholar in Psychology — 3 Ferdinand St.

Graduate, Kansei Gakuin, 1900; Scholar in Psychology, Clark University, 1907–08; Fellow, 1908–10; A.M., 1909.

MARK KOULISHOVER (DOREN), New York City
Scholar in Physics — 33 Downing St.

Student, College of the City of New York, 1910–11.

RANSOM A. MACKIE, Ps.D., Colton, Washington
Scholar in Psychology — 83 Birch St.

Student, Eugene University, Wash., 1906–08; University of Washington, 1908–09; Ps.D., Portland School of Higher Psychology, 1911.

ARTHUR MONROE, A.M., Spencer
Scholar in History — 368½ Main St.

A.B., Amherst College, 1897; Student in History, Clark University, 1910–11; A.M., 1911.

CURTIS HUGH MORROW, A.M.
Scholar in History — 4 Dudley Place

A.B., Clark College, 1910; Assistant in History, 1910–; Scholar in History, Clark University, 1910–; A.M., 1911.

WILLIAM BRYANT PERRY, A.M.
Scholar in Psychology — 13 Parker St.

B.D., Bishop Payne Divinity School, Va., 1898; A.B., Lotta University, N. C., 1908; Student in Psychology, Clark University, 1910–11; A.M., 1911.

ALLAN GALE RICE, A.B.
Scholar in History — 862 Main St.

A.B., Clark College, 1910; Scholar in History, Clark University, 1910–.

CHARLES WEBSTER ST. JOHN, A.B., Hartford, Connecticut
Scholar in Psychology — 10 Barbour St.

A.B., Clark College, 1911; Assistant in Psychology, 1911–.

WILLIAM KENDRICK SCHWAB, A.B., Rochdale
Scholar in History

A.B., Clark College, 1911.

CLARENCE PROUTY SHEDD, A.B.
Scholar in History — 4 Riedl Place

A.B., Clark College, 1909.

CLARENCE EDWIN SMITH, A.M., Moores Hill, Indiana
Scholar in Mathematics — 101 May St.

Ph.B., De Pauw University, 1894; A.M., Indiana University, 1898; Professor of Mathematics, Taylor University, 1900–04; Instructor in Mathematics, Indiana University, Spring term, 1907; Professor of Mathematics, Moores Hill College, 1907–.

ROSIE GARDNER SQUIER, A.B., Monson
Scholar in Biology — 7 Hancock St.

A.B., Wellesley College, 1899; Graduate Student in Zoölogy, 1902–03.

ANNIE ELIZABETH STOY, B.S., Everett, Washington
Scholar in Pedagogy — 17 Isabella St.

B.S., Lebanon University, Ohio, 1907.

ROBERT JAMES STREETER, A.B., Brimfield
Scholar in Economics — 38 Maywood St.

A.B., Clark College, 1910; Assistant in Economics, 1911–.

FRANCES WASHINGTON TUFTS, A.B.
Scholar in Biology — 562 Pleasant St.

A.B., Wellesley College, 1909; Student in Biology, Clark University, 1910–11.

ROBERT MORSE WOODBURY, A.B.
Scholar in Economics — 38 Maywood St.

A.B., Clark College, 1910; Assistant in Economics, 1911–.

OTHER STUDENTS

EARL VAN DUSEN BURDICK, A.B., Hamilton, New York
Student in Psychology — 15 Wachusett St.

A.B., Colgate University, 1911; Instructor in French and German, Worcester Polytechnic Institute, 1911–.

IRA T. CHAPMAN, Millbury
Student in Pedagogy

A.B., Ohio Wesleyan University, 1903; A.B., Harvard University, 1904; A.M., 1905.

HERBERT KIMBALL CUMMINGS, B.S., West Bolyston
Student in Physics

B.S., Worcester Polytechnic Institute, 1910; Instructor in Physics, 1911–.

BERTHA CAROLINE DOWNING, M.D.
Student in Pedagogy 4 Downing St.

Harvard Annex, 1887; M.D., Woman's Medical College of Pennsylvania, 1896; Honorary Fellow in Psychology and Biology, Clark University, 1905–06; Honorary Fellow in Psychology, 1906–07; Student in Psychology, 1909–10; A.M., 1910; Student in Anthropology, 1910–11; Member American Association for the Study of the Feeble-Minded; Fellow of American Academy of Medicine.

DOROTHY DRAKE, B. L., Boston
Student in Pedagogy 14 Oread St.

B.L., Smith College, 1898.

ROBERT THOMAS ELLIOTT, A.M.
Student in History 14 Pelham St.

A.B., Amherst College, 1897; Scholar in History, Clark University, 1909–10; Student, 1910–; A.M., 1911.

ARTHUR EDWARD HAMILTON, Mexico City, Mexico
Student in Psychology 23 Maywood St.

EUCLID HELIE, A.M.
Student in Psychology 9 Brookline St.

A.B., McMaster University, 1905; Scholar in Psychology, Clark University, 1905–06; Fellow, 1906–10; A.M., 1908; Student, Harvard Medical School, 1910–11.

MINNIE GILLILAND HUNTER, Tyrone, Pennsylvania
Student in Psychology 8 Piedmont St.

Graduate, State Normal School, Millersville, Pa., 1909.

SHERMAN CRARY KATTELL, B.S., Hobart, New York
Student in Mathematics 1 Lancaster St.

B.S., Amherst College, 1911; Instructor in Mathematics, Worcester Polytechnic Institute, 1911–.

MAURICE WALTER MEYERHARDT
Student in Psychology 5 Clayton St.

Student at Koelnisches Gymnasium, Berlin, 1880–87; Student in Psychology, Clark University, 1903–04; Scholar, 1904–07; Fellow, 1907–09; Honorary Fellow, 1909–11.

EDGAR PELEG NEAL, A.B., West Boylston
Student in Chemistry

A.B., Colby College, 1893; Student in Chemistry, Clark University, 1910–.

NELLIE MANN OPDALE, Marlboro
Student in Psychology

Student in Psychology, Clark University, 1907–.

CAROLINE AMELIA OSBORNE, PH.D.
Student in Psychiatry 87 Woodland St.

M.D., Woman's Medical College of Pennsylvania, 1899; Superintendent of Nurses, Memorial Hospital, Worcester, Mass., 1899–1904; Instructor of Nurses, 1904–; Student in Biology, Clark University, 1901–05; Fellow, 1905–06; Honorary Fellow, 1906–10; A.M., Clark University, 1907; Ph.D., 1908.

CARL LISLE PERCY, B.D., Charlton
Student in Sociology

A.B., Middlebury College, 1907; Instructor in English, Atlanta Theological Seminary, 1909–11; B.D., 1911.

HENRY ROBERT POWER, B.S.
Student in Chemistry 42 Fox St.

B.S., Worcester Polytechnic Institute, 1911; Assistant in Chemistry, 1911–.

CHARLES MOEN RICE, A.B.
Student in Mathematics 9 Bowdoin St.

A.B., Harvard University, 1882; Student in Mathematics, Clark University, 1909–

EDWARD BUTLER SAUNDERS, A.B., Fitchburg
Student in Psychology

B.D., St. Lawrence University, 1900; A.B., 1904; Student in Psychology, Clark University, 1906–.

MARY ALICE WAITE, A.B.
Student in Economics and Pedagogy 105 Elm St.

A.B., Smith College, 1904; Student in Economics and Pedagogy, Clark University, 1910–.

Attendants upon Saturday Courses

Lena R. Adams, North Brookfield
Bertha I. Bird, Auburn
Edith L. Bridges, Worcester
Mary J. Callahan, Worcester
Margaret A. Flaherty, Worcester
Edith A. Gainsman, Worcester
Marjorie W. Hall, Worcester
James A. Lobban, Webster
John E. Lynch, Worcester
Jean B. McIver, Worcester
Anna M. Murphy, South Framingham
Kate E. Smith, Worcester

Undergraduates Attending One or More University Courses

Samuel Flagg Bemis
Walter Guy Butler
Peng Chun Chang
Paul Lippitt Cody
Charles Henry Cummings
Henry Randall Godfrey
Henry Jacobson
Frank Thorwald Oberg
Paul Alexander Oehme
Harold Fisher Pierce

Florence Chandler, 938 Main St.
Bursar, and Clerk of the University

Elizabeth Anna Felt, 19 Bowdoin St.
Assistant in the Bursar's office

Mary Evelyn Fitzsimmons, S.B., 90 Florence St.
Stenographer

Helen Cashman, S.B., 90 Florence St.
Private Secretary to the President

Instructors	28
Fellows, Scholars and Students	84
Saturday Courses	12
Undergraduates	10
Total	134

ADMINISTRATION

The trustees are the ultimate source of authority in all matters pertaining to the University. They act collectively, through committees, and also through the President of the University.

Duties of the President of the University

The duties of this office were defined by the Trustees, May 23, 1889, as follows:

The President of the University shall consult frequently with the Trustees on all matters that concern the welfare of the University, and attend the meetings of the Board. He shall confer with each instructor concerning the development of his department, determine the duties and authority of each, and preside at the meetings of the Faculty. He shall be the authorized medium of communication between the Board of Trustees and the officers of instruction, individually and collectively, in all matters involving the administration of the University. The enactments of the Board concerning instructors and their work, and all requests, complaints and proposals from the Faculty to the Trustees shall be made known through him. He shall exercise or provide such superintendence over buildings, apparatus, books and other property, as will secure their protection and appropriate use. Expenditures must not be ordered by any instructor of the University without his previous consent or the express authority of the Board.

These duties were more fully defined by By-Laws enacted by the Corporation, Sept. 26, 1889. These are as follows:

BY-LAWS

1. The President of the University shall preside on all public academic occasions, shall direct the official correspondence, study the wants and interests of the whole University and exercise a general superintendence over all its concerns. His first care, and that of the authorities of the University, shall be the departments already established, and next those closely related to them; but no other department shall be established until those already introduced have been brought to the highest state of efficiency then possible. All acts, however, which shall involve the expenditure of money in the administration of the University's affairs, shall be subject to the approval of the Board of Trustees or the Finance Committee for the time being.

2. As the efficiency of a University depends chiefly upon the quality of its Faculty, the Board of Trustees will hold the President to a strict but reasonable accountability for the fidelity and ability of each instructor. The President only shall have the power to select and appoint all officers of instruction, subject to the approval of the Board of Trustees. To make wise and well-considered appointments, to maintain harmony within the Faculty, and to increase their efficiency in research and instruction shall be his most important duty. If at any time the President shall be negligent in the discharge of these or other duties, or is from any cause disabled from discharging them, they may be exercised by the Board of Trustees.

3. The President of the University shall be the medium of communication between the Trustees and Instructors, individually and collectively, upon all matters within the field of

action of either body. He shall attend all meetings of the Board of Trustees, of which he shall be notified, and shall participate in their deliberations, but without the power to vote. All complaints and requests from members of one body to the other shall be made through him.

4. The President shall call and preside over all official meetings of the Instructors, and a record of their proceedings shall be kept. These records are in no case to be made known to others than the Trustees. They shall always be in the custody of the President, but may be inspected by the Trustees, or either of them, at any time.

5. The President of the University, in the absence of the Trustees or Finance Committee, shall have the entire direction and control of the persons employed about the University and not engaged in the work of instruction; the duties of all such persons shall be assigned and they shall be appointed or removed by him, subject to the approval of the Finance Committee.

6. No instructor shall order any books or apparatus, or anything connected with the work of instruction (beyond his appropriation), without the approval of the President. No expense for the care of buildings or grounds, nor for alterations or repairs within and upon the same shall be made without the approval of the Board of Trustees or the Finance Committee, such alterations or repairs in no case to exceed the appropriations made for that purpose. If the Trustees, or Finance Committee,or any person, shall make contracts in behalf of the University without authority, the officer or person making such contract shall become individually responsible therefor.

7. The officers of instruction shall be appointed for a term of from one to five years. At the end of this period the work of each instructor will be subjected to a careful scrutiny upon the results of which his reappointment shall depend, always provided, however, that any Instructor will be liable to be dis-

charged at any time for incapacity, neglect of duty or for such other cause as shall seem good to the Trustees.

8. Each Instructor shall give stated lectures to however few. He shall actively and zealously strive to maintain the highest possible standard, shall work in a spirit of hearty sympathy and coöperation, and shall encourage research by precept and, if possible, by example.

9. The foregoing By-Laws are intended to embody the provisions contained in a vote passed by the corporation on the twenty-third day of May, A.D. 1889, upon the motion of Judge Devens. (See above.) If at any time hereafter any discrepancy shall be found to exist between the two, said By-Laws shall be so far modified as to conform to the provisions of said vote.

10. No instructor shall engage in any outside professional or technical pursuit without the approval of the Board, the Finance Committee, or the President.

11. These By-Laws, or any one of them, may be changed, amended, or repealed by a vote of three-fourths at least of the Trustees at any meeting of their Board duly called, notified, and held for that purpose.

GENERAL STATEMENTS

The University now consists of nine departments, in which all its work and that of Instructors, Fellows and Scholars is grouped.

These departments are as follows:

I. Mathematics
II. Physics
III. Chemistry
IV. Biology
V. Anthropology
VI. Psychology
VII. Pedagogy
VIII. Economics and Sociology
IX. History

The Faculty

The Faculty elect Fellows and take action upon general requirements for the Doctor's and Master's degrees and other promotions, act and advise upon whatever may be officially submitted to them by the Board or by the President, and consider all matters not otherwise provided for and in which all departments of the University are alike interested.

Admission

Only graduate students or those of equivalent attainments are admitted to full membership in the University, except in rare and special cases.

At present no entrance examinations are required; but by testimonials, diplomas, personal interviews, or written specimens of work, the authorities must be satisfied that the applicants have scholarship enough to work to advantage, and zeal and ability enough to devote themselves to their chosen field. The methods of the University are too costly, and its energy and funds too precious, to be spent upon those who are not well trained, promising and in earnest.

It is highly desirable that candidates entering any of the nine departments shall have, beside a knowledge of the other subjects commonly taught in colleges, a reading knowledge of French and German.

For the select students who are received, it is the purpose of the University to open all its privileges and to supply every incentive possible in the way of books, facilities, and, above all, direct personal stimulus. The chief as well as the best work of this University is individual and involves daily suggestion, encouragement and direction. The limited number of students permits more or less personal instruction in each case.

Classes of Appointees

No clearly marked line exists be ween students and instructors. Fellows who have attained some degree of mastery in a special line of work sometimes give brief special courses, which may be attended by professors.

This is a stimulus to the student, and both tests and exhibits power in teaching.

I. DOCENTS

The highest residential appointment not involving membership in the Faculty is that of Docent. These positions are designed for men of marked gifts and attainments who have at least attained the doctorate and wish to engage in research, teaching, or both.

Class A. Free Docents

Each docent of this class will be expected to deliver a limited number of lectures on some topic within his department. In so doing, he shall be entirely independent of other instructors both in his choice of special topic and his manner of treating it, and responsible only to the President of the University, by whom he shall be appointed after consultation with the head of the department. The free docent shall have command of the resources of the department in the way of books, apparatus, etc., so far as this does not interfere with its regular work. By establishing free docents, the Faculty desires not only to maintain and guarantee the fullest academic freedom, but to expose itself to all the stimulus that can come by the rivalry of younger or outside men, and to introduce new topics and new departures in old ones.

Class B. University Docents

A University docent shall engage in research and may collaborate with the head of the department or other

member of the Faculty and supplement his work. He shall be appointed by the head of the department with the approval of the President.

Habilitation of Docents

A docent of either class may prepare and read in public an habilitation address representing original work after a term of service of a length and under conditions to be determined by the Faculty for each individual case. Upon doing this, he may be formally presented with a certificate or diploma granting him the *venia docendi* or licentiate, which shall not be a title or degree, but shall attest his fitness as scholar or investigator for an academic position and shall be regarded by the University as a brevet collegiate professorship. The fee for such a certificate shall be $25, which the Faculty shall have power to remit. The compensation of a docent of either class, if any, shall be determined by the President, and the fees to be paid him by students, if any, shall be determined by the Bursar.

It is believed that the difficulties of college authorities in selecting suitable professors may be somewhat diminished by the existence of such a select body of scholars of guaranteed scientific training, ability, and approved power to teach, and that this new grade may aid in raising the standard of academic scholarship.

II. QUIZ MASTERS

Each member of the University Faculty may, with the approval of the President, appoint one or more quiz masters who with the aid of his lecture notes, or

otherwise, shall conduct review classes upon his lectures and who may hold preliminary tests, but who shall not lecture or give instruction save as review. These positions shall be regarded as honorary and as a privilege of more advanced students in perfecting their own knowledge and acquiring practice in instruction.

III. NON-RESIDENT LECTURERS

The representatives of each department may, with the approval of the President, bring eminent experts for exchange or other lectures of a special nature at any time during the academic year. They may also in return, with the approval of the President, give similar brief courses in other institutions, provided this does not interfere with their full efficiency for the work of this University.

IV. HONORARY FELLOWS

Those who have already advanced to the Doctor's degree may be appointed Honorary Fellows and given the privileges of the University, including those of the Library. In past years many who have already taken this degree, either in this country or abroad, and who are awaiting academic appointment, have found these positions both helpful for their own further research and development and also advantageous for obtaining the collegiate and university appointments that they seek.

V. CANDIDATES FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

Candidates for the Doctor's degree must have previously taken the Degree of Bachelor of Arts or have had

a substantial equivalent for the training implied by that degree.

At least one year, but in most cases three years, of graduate work are necessary for this degree. Examinations for it, however, may be taken at any time during the academic year when, in the judgment of the University authorities, the candidate is prepared, provided the requirement of one year's residence has been absolved.

For this degree one requirement is a dissertation upon an approved subject, to which it must be an original contribution of value. To this capital importance is attached. It must be reported on in writing by the chief instructor before the examination, printed at the expense of the candidate, and at least one hundred copies given to the University. However, in case of a dissertation of unusual length, or containing expensive plates, the Faculty shall have power, at the request of the candidate, to reduce this number of presentation copies to fifty.

Such formal or informal tests as the Faculty may determine shall mark the acceptance of each student or Fellow as a candidate for this degree. One object of this preliminary test shall be to insure a good reading knowledge of French and German. Such formal candidature shall precede the examination itself by a period prescribed in the special rules below.

The fee for the Doctor's degree is $25, payable before the examination. The presentation copies of the dissertation must be in the hands of the Librarian before the diploma is delivered. In exceptional cases, and by special action of the Faculty, the act of promotion may precede the presentation of the printed copies of the dissertation.

An oral, but no written, examination is required upon at least one minor subject in addition to the major before an examining jury composed of at least four members, including the head of the department and the President of the University, who is authorized to invite any person from within or without the University to be present and to ask questions. The jury shall report the results of the examination to the Faculty, who will recommend satisfactory candidates for the degree.

For the bestowal of this degree, the approbation of the Board of Trustees must in each case be obtained by their signature upon the diploma. They desire that the standard of requirements for it be kept the highest practicable, that it be reserved for those of superior ability and attainment only, and that its value be never suffered to depreciate.

It is to the needs of candidates for this degree that the lectures, seminaries, laboratories, collections of books, apparatus, etc., are especially shaped, and no pains will be spared to afford them every needed stimulus and opportunity. It is for them that the Fellowships and Scholarships are primarily intended, although any of these honors may be awarded to others.

On November 14th, 1900, the following vote was passed by the Board of Trustees:

That the University will admit candidates for the degree of Doctor of Philosophy and will confer that degree without regard to sex.

Special Rules concerning the Doctor's Degree

I. *Residence.* No candidate shall receive the degree of Doctor of Philosophy without at least one academic year's previous residence.

II. *Candidature for the Doctor's Degree.* Every applicant for the Doctor's degree shall fill out, before October fifteenth, the regular application blank provided at the office. This schedule shall be submitted to the head of the department. Before affixing his signature he shall satisfy himself, in such manner as he may desire, as to the fitness of the applicant.

III. When countersigned, this schedule shall be filed with the President, and the applicant will be examined in French and German by the annual committee for that purpose.

IV. In case of a favorable report by this committee, the applicant shall be a regular candidate for the degree.

V. Candidates complying with all preliminary conditions, including the examinations in French and German, before November first will be allowed to proceed to the doctor's examination at any time between May fifteenth following and the end of the academic year.

VI. *The Doctor's Dissertation.* The dissertation must be presented to the instructor under whose direction it is written, and reported upon by him before the doctor's examination. In every case the dissertation shall be laid before the jury of examination, at the time of examination, in form suitable for publication. This provision shall not, however, preclude the making of such minor changes later as the chief instructor may approve.

VII. The dissertation shall be printed at the expense of the candidate and the required copies deposited with the Librarian within one calendar year after the first of October following the examination. The candidate alone will be held responsible for the fulfilment of these conditions.

VIII. The favorable report of the chief instructor, filed in writing with the Clerk of the University, shall be a sufficient imprimatur or authorization for printing as a dissertation. The printed copies shall bear upon the cover and title page the statement of approval in the following words, over the signature of the chief instructor:

> A Dissertation submitted to the Faculty of Clark University, Worcester, Mass., in partial fulfilment of the requirements for the degree of Doctor of Philosophy, and accepted on the recommendation of
>
> (NAME OF CHIEF INSTRUCTOR)

IX. *Examinations for the Doctor's Degree.* The examinations for the doctor's degree may be held at any time during the academic year, provided that at least one academic year has elapsed since the completion of the preliminaries of candidature, except in the case of fulfilment of these conditions between the beginning of any academic year and November first of that year, to which case Rule V applies. The examinations shall be held at such hours and places as the President may appoint.

X. Examinations may also be held during the regular vacations of the University, but for these an additional fee of five dollars to each examiner and the reasonable travelling expenses of any examiners who are out of town, all payable in advance, will be required.

VI. CANDIDATES FOR THE DEGREE OF MASTER OF ARTS

This degree is conferred upon candidates who comply with the following requirements:

1. The candidate shall have previously taken the degree of Bachelor of Arts, or have had a substantial

equivalent for the training implied by that degree, to be determined by special vote of the Faculty; but such degree or training must involve a good preparation for the work proposed for the Master's degree, in order that it may be accepted.

2. The candidate must devote a full academic year to post-graduate work in this University after receiving the Bachelor's degree or the training accepted as its equivalent. This work shall be mainly in one department, but the candidate may do also such other work as shall be advised by the head of his principal department, —whose approval of the whole course shall be necessary. In particular cases, the candidate may be allowed, by special vote of the Faculty, to divide his work between two years; but the aggregate must, in all cases, amount to a full year's work, at least.

3. The candidate must satisfy the representatives of his principal department that he has done his work faithfully and has mastered the subjects involved, by such written and oral examinations and other tests as the department may require. The head of the department shall make a written report to the Faculty of the grounds on which the candidate is recommended, specifying the amount and character of his work, and this report shall be filed in the office.

4. The candidate must present a thesis or written report on some topic included in his course or closely related to it, that shall receive the approval of the representatives of his principal department, be accepted by the Faculty, and filed in the office.

5. Every candidate recommended for the Master's degree shall pay a fee of ten dollars.

6. The Master's degree will be conferred at the annual commencement in June of any year on those candidates only who shall have made written application to be considered as such on or before January 15th preceding and shall have fulfilled all the conditions here specified at least one week before Commencement, at which time the academic year shall be regarded as ending for the purposes of section 2.

VII. SPECIAL STUDENTS NOT CANDIDATES FOR A DEGREE

Any one desiring to undertake a special and approved line of research, and whose attainments are such as to satisfy the requirements of the University, may also be received. This class includes persons who may desire to devote themselves exclusively to one or more of the special branches—mathematics, physics, chemistry, biology, anthropology, psychology, pedagogy, economics and sociology, or history,—but who do not care to matriculate or become candidates for a degree.

These students, provided they satisfy the heads of the departments of their training and competency in one subject, in which they must be advanced (although they may be less so, or even beginners, in other subjects), may be allowed entire freedom in their choice and combination of studies, and as special students may enjoy all the privileges of the University.

These students may, with the approval of the President, be received for less than an entire year.

VIII. PRELIMINARY CANDIDATES

Non-university students of less special or less advanced standing than the above classes, who contemplate be-

coming candidates for some higher degree, may also be received.

Students of this class must satisfy the authorities of the University of their attainments and that they contemplate advancing to a degree higher than that of A.B. The privileges and status of these students will be more fully defined later. They may, in exceptional cases, be elected to Scholarships.

Fellowships and Scholarships

From the George F. Hoar Fund of $100,000 provided by the generosity of Andrew Carnegie, the sum of $3,000 is now available for Junior and Senior Fellowships in the University. While the sums attached to these appointments are not fixed, a Senior Fellow may receive $200 together with the remission of fees; which makes the value of the appointment $300. A Junior Fellow may receive $100 with remission of fees, which makes the value of the appointment $200. Besides these, other appointments of Senior and Junior University Scholarships, with remission of fees, are made.

A citizen's fund

A citizen of Worcester has given a fund of $5,000, the income of which is to be used for the aid of "some one or more worthy native born citizens of the city of Worcester who may desire to avail themselves of the advantages of the institution."

THE FIELD FUND

Mrs. Eliza W. Field has also given $500 to be called the "John White Field Fund," the income of which is "to provide for the minor needs of a Scholar or Fellow."

The following regulations apply to the award of the income of the Field Fund:

1. Regard is had to the intellectual ability of the candidate as well as to need of pecuniary assistance.
2. Only candidates who have spent three months at the University are considered.
3. The head of each department will consider and report to the Faculty desirable cases in his department.
4. Applications are received not later than December 15th, and the awards made as soon as possible after the Christmas recess.

THE ELIZA D. DODGE FUND

Mrs. Dodge has given $1,000 to be known as the "Eliza D. Dodge Fund," the income only to be expended in aid of graduate students of limited means engaged in research work.

PURPOSE AND CONDITIONS OF FELLOWSHIPS AND SCHOLARSHIPS

Fellowships at Clark University are intended for young men and women of promise who desire to pursue post-graduate studies in order to fit themselves for intellectual careers. It is desirable, but not required, that candidates for these positions should intend to proceed to the degree of Doctor of Philosophy or to equivalent attainments. In general, those intending to devote themselves to some

special branch of learning are preferred to those directly fitting themselves for one of the three learned professions, although the latter are not excluded.

No application blanks are provided, but it is desired that the candidate should state fully and in writing his previous course of study and submit testimonials or diplomas, especially such as indicate a decided preference for some particular department. These should be accompanied also, if practicable, by some specimen of the candidate's work. Applications will be considered in May and in October and should be in the hands of the President on or before the first day of either month. In special cases vacancies may be filled by appointments at any time during the year. The names of unsuccessful candidates will not be made public.

Fellows must reside in Worcester during the entire academic year, devote themselves to special studies under the direction of their instructors, and give such evidence of progress or proficiency before the end of the year as the authorities shall require. It is generally expected that they will undertake some work of research during the year. They must coöperate in promoting harmony, order, and all the ends of the University, must not teach elsewhere, and may be reappointed at the end of the year. Being intended primarily as honors, both Fellowships and Scholarships are awarded without reference to pecuniary needs, so that those Fellows able and desiring to do so may relinquish the emolument and retain the title.

The paying fellowships will, for the present, be restricted to the departments of mathematics, physics, chemistry, biology, psychology, pedagogy, anthropology, and history.

Besides field work, excursions to institutions (public and private), coaching and cram classes, clubs, examinations, and other modes by which knowledge now seems best imparted and retained, the following educational methods are prominent:

Lectures. The Trustees desire that each instructor, of however few students, should prepare and deliver regular lecture courses, with diagrams, illustrative apparatus, and reference to standard text-books and the best current literature upon each topic. Advanced students are also encouraged to supplement the work of the professors by giving occasional special lectures and courses. Public lectures will be given from time to time.

Seminaries and Conferences. These are stated meetings for joint systematic work, under the personal direction of the professor, in some special part of his subject. Here students preparing theses and papers for publication in the journals edited at the University read them in incomplete form for mutual criticism and help. Here, also, the results of individual reading are reported for the benefit of all; views are freely criticised; new inquiries, methods, comparisons, standpoints, etc., suggested. From the mutual stimulus thus given many important works have proceeded and the efficiency of universities has been greatly increased.

Laboratory Work. For beginners this has been from the first the best of all forms of apprenticeship, bringing student and professor to a closer and mutually stimulating relation. Here the manipulation of apparatus is learned, processes are criticised, results obtained

by other investigators are tested, and methods discussed and perfected, with a view to developing that independence in research which is the consummation of scientific culture.

Notices

The charge for tuition, giving all the privileges of the University, but not covering the laboratory fees, is $100 per annum.

Board and lodging can be obtained near the University at very moderate rates.

Intending students will be given information, so far as possible, upon any of these or other points, in advance of official announcement, upon addressing the Clerk of the University, Miss Florence Chandler, Worcester, Mass.

All members of the University are expected to be present at the opening of each term and to continue in attendance to its close.

The following are the statements and announcements of the departments for the academic year, 1912–1913.

I. MATHEMATICS

Programme for 1912–1913.

instruction in mathematics

The chief aim of the department is to make independent investigators of such students as have mathematical taste and ability; these naturally look forward to careers as teachers of the higher mathematics in colleges and universities, and we believe that the course of training best adapted to the development of investigators is also that which is most suitable for all who would be efficient college professors, even if they are not ambitious to engage in research. The first essential of success in either of these lines is the habit of mathematical thought, and the direct object of our instruction is the acquisition of this habit by each of our students. With this end in view, we expect every student to make himself familiar with the general methods and most salient results of a large number of different branches of mathematics, conversant with the detailed results and the literature of a few branches, and thorough master of at least one special topic to the extent of making a real contribution to our knowledge of that subject.

In accordance with these principles, the instruction is given by means of introductory, advanced and special courses of lectures, seminaries, and personal guidance in reading and investigation.

The introductory courses (mostly given in alternate years) treat the following subjects:

Analytic Geometry of Conics, Higher Plane Curves, Quadrics, Higher Surfaces, and Twisted Curves; 5 hours a week, through the year.

Differential Equations, and Calculus of Variations; 5 hours a week, through the year.

Theory of Functions of Real and Imaginary Variables, Eliptic Functions, and Definite Integrals; 5 hours a week, through the year.

Theory of Numbers; 2 hours a week, one half-year.

Modern Synthetic Geometry; 2 hours a week, one half-year.

Algebraic Substitutions and their Application to the Theory of Equations; 2 hours a week, one half-year.

Algebraic Invariants; 2 hours a week, one half-year.

Finite Differences; 2 hours a week, one half-year.

It is expected that every student will take each course in the earliest year of his residence in which it is given, unless he has already completed an equivalent course elsewhere. The chief object of these courses is to make the student familiar with the various methods of mathematical research and the concepts of mathematical thought at the present day. Thus, for example, curves and surfaces are treated by modern methods from the beginning, with adequate consideration of the discoveries of the great geometers of recent times. The usual college courses in the theory of algebraic equations, analytic geometry, and the differential and integral calculus furnish all the necessary preparation for these introductory courses, although it is very desirable that the student be acquainted with the properties of determinants and their application to the solution of linear equations, and with the methods of solving differential equations of the simpler types. Deficiencies in these subjects may be made up by attendance on the corresponding courses in the Collegiate Department of the University.

Special advanced courses, open to all who are prepared for them, are given annually in subjects varying with the interests of the instructors and the needs of the students.

These advanced courses are not repeated at regular intervals, but properly prepared students will receive the personal assistance of one or other of the instructors in reading any subject not announced for the year in which they desire to take it.

The number and scope of the advanced courses given each year have been, thus far, regulated by the number of students qualified to profit by them and by the individual interests of the instructors; these courses will be increased, both in number and variety, whenever a real demand for such an increase shall make itself apparent. While the present purely scientific character of the University precludes instruction in strictly technical branches, we hope that the time is not far distant when the demand shall make it advisable, and increased facilities shall make it possible, to announce courses in Descriptive Geometry, Graphical Statics, Mathematical Astronomy, Vital Probabilities, and all the more important applications of mathematics to other sciences and to technical subjects. The applications of mathematics to physics already receive adequate consideration, and the further extension of such applications awaits only a demand for it on the part of students.

The subjects in which advanced courses may be expected to be given every few years include the following:

History of Mathematics.

Arithmetic: Numerical computations; Theory of numbers; Finite differences and the Calculus of operations; Probabilities and the Theory of errors.

Algebra: Substitution-groups and the Galois theory of equations; Invariants; Quadratic forms; Simultaneous equations (including Restricted systems); Multiple algebra.

Higher Analysis: Differential equations, ordinary and partial; Continuous groups; Definite integrals and Fourier's series.

Theory of Functions: Functions of real and complex variables; Point-aggregates; Elliptic functions; Abelian integrals.

GEOMETRY: Modern synthetic geometry; Analytic geometry of higher plane curves, higher surfaces, and twisted curves; Rational and uniform transformations of curves and surfaces; Infinitesimal geometry; Analysis situs; Quaternions; Hyperspace and non-euclidean geometry.

SYMBOLIC LOGIC.

Other courses will be given whenever there is a demand for them, as in the past. The instructors are always glad to assist students in any line of mathematics that falls within the range of their own studies. The small number of students makes it possible to give personal attention to individuals, and the intimate and confidential relation thus established between pupil and teacher is an advantage that cannot be overestimated and ought not to be left out of account by the prospective student in determining where his studies shall be pursued.

For the academic year 1912–13, the following courses of lectures are announced:

BY PROFESSOR STORY

Introductory Course:

ANALYTIC GEOMETRY OF HIGHER PLANE CURVES, HIGHER SURFACES, AND TWISTED CURVES; 3 hours a week through the year.

Advanced Courses:

CALCULUS OF OPERATIONS AND FINITE DIFFERENCES; 3 hours a week, through the year.

THEORY OF ERRORS; 3 hours a week, first half-year.

INFINITESIMAL GEOMETRY; 3 hours a week, second half-year.

SEMINARY FOR ADVANCED STUDENTS; through the year.

BY PROFESSOR TABER

Introductory Course:

THEORY OF FUNCTIONS OF REAL AND IMAGINARY VARIABLES, ELLIPTIC FUNCTIONS AND DEFINITE INTEGRALS; 5 hours a week, through the year.

Advanced Courses:

INTEGRAL EQUATIONS; 2 hours a week, first half-year.

HYPER-COMPLEX NUMBER SYSTEMS; 2 hours a week, second half-year.

SEMINARY; through the year.

BY PROFESSOR WEBSTER

[See announcement of Department of Physics, courses 10, 11, 13, 14.]

BY M. DE PEROTT

Introductory Course:

THEORY OF NUMBERS; 2 hours a week, first half-year.

ADVANCED COURSE:

ABELIAN INTEGRALS; 2 hours a week, second half-year.

BY DR. WILLIAMS

Introductory Course:

CONIC SECTIONS AND QUADRIC SURFACES (Modern methods, homogeneous coördinates, etc.); 2 hours a week, through the year.

While desirous of supplying all possible facilities to those who wish to pursue studies in special branches, and to those who, already occupying permanent positions, have but a limited leave of absence, we have made it our chief object to provide a thorough training for those who, having just completed a college course, have not yet entered upon their life-work. This provision consists of such courses of lectures, seminaries, and individual assistance as should enable a faithful student endowed with the proper natural ability to satisfy the requirements for the degree of Doctor of Philosophy at the end of his third year with us. The requirements for this degree have been determined by our conception of the ideal teacher, as already stated. To acquire the necessary breadth of knowledge of mathematics as a whole, the candidate is expected to attend, during his first two years, specified introductory courses of lectures on the general principles, methods, and results of all the more important branches of pure mathematics, to supplement these lectures by private reading and to take an active part in the seminary. In the seminary, a special topic more or less directly connected with the subject

of some lecture, is assigned, from time to time, to each student, who is required to read it up and make an oral report upon it before the class. Each candidate for the Doctor's degree is expected to attend a number of advanced courses. He spends the greater part of his third year in the original investigation, under the constant personal guidance of one of the instructors, of a topic of his own selection. In preparing for this investigation he is required to make a practically complete bibliography of the subject and to read all the more important available articles that have been written on it. The results of the investigation, embodied in a dissertation suitable for printing, must be submitted to the instructor under whose direction the work was done, and must receive his approval before the candidate will be admitted to the final examination for the degree. This approval will not be given unless the dissertation is satisfactory in form and completeness and the results are sufficiently novel and important to constitute a real contribution to science. The dissertation is, in fact, the main criterion by which the candidate is judged, and no amount of other work will compensate for its defects.

Each of the instructors is engaged in research and has always a number of investigations planned for himself, which have often been carried to a well advanced stage but are not completed for want of time. Such incomplete investigations are given to properly prepared candidates for the Doctor's degree, and they receive from the instructor all the assistance necessary for the completion of the work, thus becoming, to a certain extent, collaborateurs with the instructor.

The preparation of a bibliography of any topic is greatly facilitated by a classified index of mathematical literature on the card-catalogue plan, which has been prepared under the supervision of Professor Story and now includes nearly one

hundred thousand titles of periodical articles, separate memoirs, and books in all fields of pure mathematics. This index is much more complete than the Royal Society's catalogue, even in the restricted field of that catalogue (periodicals published between 1800 and 1900), and will be extended as rapidly as possible.

The ability of our graduates to carry on research and the excellence of the work actually done is assured by the regulation that each dissertation accepted by us as worthy of the degree shall be printed with the explicit approval of a member of our Faculty. It is evident that, whereas any one that has the necessary preparation and taste for mathematics may profit by the advantages here afforded, only those who have a certain amount of mathematical genius can secure the degree.

In making appointments to fellowships and scholarships we have endeavored to maintain the same high standard. We are on the lookout for mathematical geniuses; but it is difficult to determine from the evidence of others whether candidates come up to our standard or not; so that we have adopted the general policy of giving the best appointments to those only that have been with us for at least one year, and about whom we are in position to judge for ourselves. Of course, this policy could not be carried out during the earlier years of the University, and its effect is apparent in the fact that, whereas seventy-five per cent of the students that entered the mathematical department during the first three years remained with us but one year, only thirty-three per cent. of those that have been admitted from 1892 to the present time left at the end of their first year. We do not mean to imply that those who left before completing our course were inferior in ability to those who remained three years, but we desire particularly to encourage men who can and will go forward to the degree.

Nearly all of those who have studied mathematics with us have adopted teaching as a profession, sixty-eight per cent are now members of college faculties, and thirteen per cent are engaged in higher school work. Those who have received the doctor's degree have generally secured at once desirable positions in which to begin their life-work, and most of them have already acquired for themselves, by distinguished ability, very decided influence in the institutions with which they are connected.

The degree of Master of Arts will be conferred upon students who complete with credit an approved course of one year and present a satisfactory thesis.

Every facility for the study of special branches will be given to properly prepared students who are not candidates for a degree, as also to those who, having already attained to the Doctor's degree (here or elsewhere), wish to continue mathematical study or investigation.

Material Facilities

The library is provided with the more important text-books, treatises, and memoirs on the various branches of mathematics, as well as the principal journals and transactions of learned societies that are devoted to any considerable extent to mathematics. A list of these journals will be found below.

The mathematical department possesses a good collection of models, a Thomas arithmometer, and an Amsler planimeter with revolving table.

List of Journals Relating to the Exact Sciences in the University Library

---

Amsterdam.

Koninklijke akademie van wetenschappen. Verhandelingen, 1854 to date. Complete.

Revue semestrielle des publications mathématiques. 1893 to date. Complete.

Baltimore.

American chemical journal. 1879 to date. Complete.

American journal of mathematics. 1878 to date. Complete.

Bangkok.

Siam society. Journal. 1905-07.

Berlin.

Berliner mathematische Gesellschaft. Sitzungsberichte. 1902 to date. Complete.

Chemisches Centralblatt. 1897 to date. Complete.

Deutsche chemische Gesellschaft. Berichte. 1868 to date. Complete.

Fortschritte der Physik. 1847 to date. Complete.

Jahrbuch über die Fortschritte der Mathematik. 1868 to date. Complete.

Journal für die reine und angewandte Mathematik. 1826 to date. Complete.

Königlich-preussische Akademie der Wissenschaften. Mathematische und naturwissenschaftliche Mittheilungen aus den Sitzungsberichten. 1882-97. Complete.

Zeitschrift für angewandte Chemie. 1888 to date. Complete.

Bologna.

Istituto di. Bologna. Reale academia delle scienze.

Commentarii. 1731-1791. Complete.

Novi commentarii. 1834-1849.

Memorie fis. e mat. 1806-1910.

Memorie. 1850 to date. Complete.

Scientia; rivista di scienza. 1910 to date. Complete.

Boston.

American academy of arts and sciences. Proceedings. 1870 to date. Complete.

North American Review. 1815–1886.

Technology review. 1899 to date. Complete.

Boulder, Colorado.

University of Colorado. Studies. 1902 to date. Complete.

Braunschweig.

Deutsche physikalische Gesellschaft. Berichte. 1903 to date. Complete.

Jahresbericht über die Fortschritte der Chemie. 1847 to date. Complete.

Breslau.

Kaiserlich-Leopoldinisch-carolinische deutsche Akademie der Naturforscher. 1843.

BRUXELLES.

Académie royale des sciences des lettres et des beaux-arts de Belgique.

Bulletins. Ser. 3. 1889 to date.

Mémoires couronnés et mémories des savants étrangers. 1889-90.

CAMBRIDGE, ENGLAND.

Cambridge philosophical society.

Proceedings. 1843 to date. Complete.

Transactions. 1822 to date. Complete.

CAMBRIDGE, MASSACHUSETTS.

Science. 1883 to date. Complete.

CHARLOTTESVILLE, VIRGINIA.

Annals of mathematics. 1884 to date. Complete.

CHICAGO.

Astrophysical journal. 1895 to date. Complete.

Terrestrial magnetism. 1896 to date. Complete.

COLUMBIA, MISSOURI.

University of Missouri studies. Science series. vol. 1. 1905-07.

DRESDEN.

Zeitschrift für Chemie und Industrie der Kolloide. 1906 to date. Complete.

EASTON, PENNSYLVANIA.

American chemical society.

Chemical abstracts. 1907 to date. Complete.

Journal. 1879 to date. Complete.

Proceedings. 1878 to date. Complete.

EDINBURGH.

Edinburgh mathematical society. Proceedings. 1884-1907.

Edinburgh philosophical journal. 1819-1826.

Edinburgh royal society transactions. 1873 to date. Complete.

GÖTTINGEN.

Königliche Gesellschaft der Wissenschaften. Nachrichten von der k. Gesellschaft der Wissenschaften und der Georg-Augusts-universität. 1853 to date.

GREIFSWALD.

Archiv der Mathematik und Physik. 1901 to date.

HAARLEM.

Hollandsche maatschappij der wetenschappen. Archives néerlandaises des science exactess et naturelles. 1866 to date. Complete.

HALIFAX.

Nova Scotian institute of science.

Proceedings and transactions. Halifax. 1890 to date. Complete.

HALLE.

Zeitschrift für Electrochemie. 1895 to date. Complete.

HAMBURG.

Mathematische Gesellschaft. Mittheilungen. 1890 to date. Complete.

Zeitschrift für anorganische Chemie. 1892 to date. Complete.

HEIDELBERG.

Annalen der Chemie. 1832 to date. Complete.

INDIANAPOLIS.

Indiana academy of science. Proceedings. 1895-98.

ITHACA.

Journal of physical chemistry. 1896 to date. Complete.

LAWRENCE, KANSAS.

Kansas University science bulletin. 1902-1908.

LEIPZIG.

Acta Eruditorum, 1682-1731. 50 vols. Supplementa, 1692-1734. 10 vols. Indices generales, 1693-1733. 10 vols. in 5.

Nova Acta Eruditorum, 1732-1782. 13 vols. Supplementa, 1735-1739. 3 vols. in 2.

Annalen der Physik. 1824 to date. Beiblätter, 1889 to date. Complete.

Archiv für Optik. vol. 1. 1908.

Chemische Novitäten. 1905-08.

Deutsche Mathematiker-vereinigung. Jahresbericht. 1890 to date. Complete.

Encyklopädie der mathematischen Wissenschaften mit Einschluss ihrer Anwendungen.

Fortschritte der Chemie, Physik und physikalischen Chemie. 1909.

Internationale Mathematiker-congresse. Verhandlungen. 1897 to date. Complete.

Jahrbuch der drahtlosen Telegraphie und Telephonie. 1908 to date. Complete.

Jahresbericht über die Leistungen der chemischen Technologie. 1856 to date. Complete.

Journal für praktische Chemie. 1834 to date. Complete.

Königlich-sächsische Gesellschaft der Wissenschaften.

Berichte über die Verhandlungen der mathematisch-physischen Classe. 1849 to date. Complete.

Abhandlungen der mathematisch-physischen Classe. 1852 to date. Complete.

Mathematische Annalen. 1869 to date. Complete.

Zeitschrift für Chemie. 1866-71.

Zeitschrift für Mathematik und Physik. 1856 to date. Complete.

Zeitschrift für physikalische Chemie. 1887 to date. Complete.

Zeitschrift für mathematische und naturwissenschaftliche Unterricht. 1903 to date

LIÈGE.

Société royale des sciences. Mémoires. 1843 to date. Complete.

LONDON.

British academy. Proceedings. 1905. 1907.

British association for the advancement of science. Reports. 1831 to date Complete.

Chemical news and journal of physical science. 1904 to date. Complete.

Chemical society of London.

Annual reports on the progress of chemistry. 1905 to date. Complete.

Journal. 1849 to date. Complete.

Electrician. 1891 to date. Complete.

International catalogue of scientific literature. 1902 to date. Complete.

London mathematical society. Proceedings. 1865 to date. Complete.

Royal Society.

Proceedings. 1800 to date. Complete.

Philosophical transactions. 1665 to date. Complete.

Nature. 1870 to date. Complete.

Nineteenth century. 1877 to date. Complete.

Philosophical magazine. 1798 to date. Complete.

Quarterly journal of pure and applied mathematics. 1857 to date. Complete.

Quarterly review. 1809-1885.

Science abstracts. 1898 to date. Complete.

Science progress in the 20th century. 1907 to date. Complete.

MADISON.

Wisconsin academy of arts and sciences. Transactions. 1898.

MANILA.

Philippine journal of science. 1906 to date. Complete.

MILANO.

Annali di matematica, pura ed applicata. 1889 to date.

Reale istituto lombardo di scienze e lettere. Classe di scienze mathematiche e naturali.

Rendiconti. 1864-67. Complete.

Rendiconti. 1868 to date. Complete.

Memorie. 1843 to date. Complete.

MONTREAL.

Royal society of Canada. Proceedings and transactions. 1882-1906.

NEW HAVEN.

American journal of science and arts. 1871 to date. Complete.

NEW YORK.

American mathematical society.

Annual register. 1892 to date. Complete.

Bulletin. 1894 to date. Complete.

Transactions. 1900 to date. Complete.

American society of biological chemists. Proceedings. 1907 to date. Complete.

Appleton's journal of literature, science and art. 1869-76.

Electrical world and engineer. 1907 to date. Complete.

Journal of biological chemistry. 1905 to date. Complete.

The Minerva. 1824-26.

New York Mathematical Society. Bulletin. 1891-94. Complete.

Popular science monthly. 1872 to date. Complete.

Physical review. 1894 to date. Complete.

OXFORD.

Messenger of mathematics. 1862 to date. Complete.

PALERMO.

Circolo matematico di Palermo. Rendiconti. 1887 to date. Complete.

PARIS.

Annales de Chemie et de physique. 1789-1908.

Annales scientifiques de l'École normale supérieure. 1864 to date. Complete.

Association française pour l'advancement des Sciences. Comptes rendus des sessions. 1873 to date. Complete.

Bulletin des sciences mathématiques. 1870 to date. Complete.

Bureau international des poids et mesures 1881. to date. Complete.

École polytechnique. Journal. 1794 to date. Complete.

Institut de France. Académie des sciences. Comptes rendus hebdomadaires des séances. 1835 to date. Complete.

Journal de mathématiques pures et appliquées. 1836 to date. Complete.

L'éclairage électrique. 1894-1907.

Nouvelles annales de mathématiques. 1842 to date. Complete.

Revue des deux mondes. 1908 to date. Complete.

Revue générale des sciences pures et appliquées. 1903 to date. Complete.

Revue scientifique. 1863 to date. Complete.

Société chimique de Paris. Bulletin. 1858 to date. Complete

Société mathématique de France. Bulletin. 1873 to date. Complete.

ST. PETERSBURG.

Journal of physical chemistry. (Russian Text.) Chemical section and physical section. 1909 to date.

PHILADELPHIA.

Academy of natural sciences of Philadelphia. Proceedings. 1890 to date. Complete.

American electrochemical society. Transactions. 1902-1910. Complete.

Lippincott's magazine of literature, science and education. 1868-1881.

PISA.

Il Nuovo Cimento. 1891 to date. Complete.

ROME.

Reale accademia dei lincei. Atti. Rendiconti. etc. 1847 to date.

SACRAMENTO.

Lick observatory. Publications. 1887-1903.

SALEM, MASSACHUSETTS.

American Association for the advancement of science. Proceedings. 1848 to date. Complete.

SIDNEY.

Australasian association for the advancement of science. 1888 to date. Complete.

STOCKHOLM.

Acta mathematica. 1882 to date. Complete.

Bibliotheca mathematica. 1884 to date. Complete.

STRASSBURG.

Zeitschrift für physiologische Chemie. 1877 to date. Complete.

STUTTGART.

Jarhbuch der organischen Chemie. 1908. to date. Complete.

Sammlung Chemischer und chemisch-technischer Vorträge. 1896 to date. Complete.

TOKYO.

Journal of the College of Science of the Imperial University of Japan.

Mathematico-physical society. Proceedings (Tôkyô sûgakubuturigakkwai kizi). 2nd Ser. 1901 to date. Complete.

TOULOUSE.

Université de Toulouse. Faculté des sciences. Annales. 1887 to date. Complete.

URBANA, ILLINOIS.

University of Illinois. University studies. 1900-1908.

WASHINGTON, D. C.

National academy of sciences.

Biographical memoirs. 1877 to date. Complete.

Memoirs. 1883-1902.

Reports. 1883 to date. Complete.

U. S. Bureau of Standards. Bulletin. 1905 to date. Complete.

U. S. Naval observatory. Publications 1900-1903.

U. S. Naval observatory. Astronomical and meteorological observations. 1885-89.

WIESBADEN.

Zeitschrift für analytische Chemie. 1862 to date. Complete.

WIEN.

Kaiserliche Akademie der Wissenschaften.

Denkschirften; mathematisch-naturwissenschaftliche Classe. 1850-1908.

Sitzungsberichte der mathematisch-naturwissenschaftlichen Classe. 1848 to date. Complete.

Monatshefte für Mathematik u. Physik. 1908.

Monatshefte für Chemie und verwandte Theile anderer Wissenschaften. 1881 to date. Complete.

WORCESTER.

The Mathematical review 1896-97.

II. PHYSICS

The Department of Physics of Clark University is exclusively a department for graduate study and research in pure and applied physics. In order to set forth to the intending student the facilities of this department, stress may be laid on a number of points in which it is believed that the conditions here are exceptional.

First, the fact that the attention of the professor is not distracted from the needs of the student by other duties, which, combined with the small number of students in the department enables an amount of personal attention to be given to each one which is, perhaps unique in this country. The head of the department is able to see each student and to give him personal advice in the conduct of his researches or his studies every day if necessary. The facilities without which no graduate department of research in physics can be complete are comprised under three heads: first, a systematic course of lectures in theoretical or mathematical physics; second, a laboratory with a sufficient number of rooms for individual work and with a sufficient equipment of apparatus and an instrument shop for the speedy production of whatever may be necessary for the research in hand; third, a library containing the classic works on physics, with full sets of journals and proceedings of learned societies by which the history of progress, past and present, may be studied, and kept up-to-date by the continual purchase of the latest works. In all these directions the facilities offered by this department invite attention.

The lecture courses are so arranged as to cover in a cycle of two years all the principal subjects and methods of theoretical physics. The pursuit of them will fit the student to read and study with facility any memoirs on mathematical physics. The courses are so arranged that, although they follow in order, it is possible for a student to begin in either year of the cycle. The regular courses are those not marked with a star, and constitute a course of from five to seven hours weekly. The starred courses are delivered at irregular intervals, according to the demands or the presence of students of sufficient advancement.

LECTURES

1. Dynamics. General Principles, Equations of Lagrange and Hamilton, Methods of Hamilton and Jacobi, Systems of Particles, Rigid Bodies.

This course is fundamental for the pursuit of all the others, and includes a detailed account of the principle of Least Action and the differential equations of Lagrange, preparatory to their application to other parts of mathematical physics such as optics and electricity.

2. Newtonian and Logarithmic Potential Functions, Attraction of Ellipsoids.

This course is a necessary preliminary to the study of electricity and magnetism, of hydrodynamics, and of the figure of the earth.

3. Elasticity, Hydrodynamics, Wave and Vortex Motion, Dynamical Basis of Sound and Light.

This course is the basis of applications of the theory of wave motion to sound, light, electro-magnetism, and earthquake waves, and to the study of meteorology.

3a. * Dynamics of Cyclic and Oscillatory Systems, with Applications to the Theory of Electricity, Sound and Light.

The substance of the preceding courses is contained in Professor Webster's Treatise on Dynamics, B. G. Teubner, Leipzig.

3b. * The Theory of Resonance with Applications to the Measurement of Sound and to Wireless Telegraphy.

This course takes up Professor Webster's original researches in acoustics, and also shows how the methods there employed bear on the fundamental electrical phenomena involved in wireless telegraphy.

4. Electricity and Magnetism. The Classical Theories and the Theory of Maxwell, with an account of the principal methods for the solution of problems and applications to absolute measurements.

The substance of this course is found in Professor Webster's Mathematical Treatise on the Theory of Electricity and Magnetism, London, Macmillan & Co.

4a. * Recent Developments in Electrical Theory, including the Theory of Lorentz and the Principle of Relativity.

The application to the theory of electrons and to the optics of bodies in motion.

5. The Theory of Light. Propagation of Light, Diffraction, Reflection and Refraction, Dispersion, Double Refraction, Polarization, Metallic Reflection, Magneto-optics.

5a. * Comparison of Theories of the Ether.

Critical and historical examination of the various mechanical explanations of the luminiferous ether, including those of Green, McCullagh, Kelvin, Maxwell, Sommerfeld and Larmor.

5b. * Geometrical Optics. Properties of Systems of Rays, and their Various Aberrations. Hamilton's Characteristic Function or Eikonal. Applications to Optical Instruments.

6. Thermodynamics. Thermo- and Electro-Chemistry.

The establishment of the two laws of thermodynamics, and their application, by means of the methods of Gibbs and Helmholtz, to the examination of physical and chemical phenomena. Application to heat-engines, including steam, gas, and oil engines, the flow of gases and vapors, and the steam turbine. The conditions of chemical equilibrium, phenomena of electrolysis, osmotic pressure, and capillarity.

7. The Kinetic Theory of Gases. The Maxwell-Boltzmann Theorem and the Elements of Statistical Mechanics.

8. * The Theory of Radiation and of a Black Body.

The relations obtained from the laws of Kirchhoff, Stefan, Wien, and Planck, by the recent applications of thermodynamics.

9. * The Phenomena of Conduction of Electricity in Gases, and of Radioactivity, and their Bearing on the Structure of the Atom.

10. The Partial Differential Equations of Mathematical Physics.

Laplace's Equation, Equation of Thermal and Electrical Conduction, Equation of Wave-motion, Helmholtz's Equation, Lorenz-Beltrami Equation, Telegrapher's Equation, and their special cases; methods of

Cauchy, Green and Riemann; Normal functions, Developments in Series, Fourier's Series, Legendre's, Laplace's, Bessel's and Lamé's functions.

This course is one of the most important for the physicist, and treats a great variety of subjects from the most varied fields, grouping them all into a connected system, and embracing all the methods of theoretical physics.

11.* The Elements of Integral Equations, and their application to Mathematical Physics.

12.* Selected Chapters in the Application of Theoretical Physics to Cosmical Phenomena. including Problems in Geodesy, the Tides, Meteorology, Seismology, and Terrestrial Magnetism.

13.* Linear Differential Equations.

The applications of the theory of functions to the linear differential equations of the second order which arise in mathematical physics.

14.* Orthogonal Surfaces and Curvilinear Coördinates and their Applications.

The courses for 1912-13 will be 1, 2, 3 4. During the past year 3b, 5. 5a. 6, 7, 8, 10, 11 have been given.

In addition to the above formal courses there is held a weekly Colloquium, or meeting for the informal discussion of subjects not treated in the lectures, and for the presentation by the students of reports on important articles appearing in the journals. A part of the work of the colloquium consists in the systematic presentation of certain classical researches, more or less connected with the lectures, in preparing which the students make use of the original sources of information, thus gaining much acquaintance with the methods of the masters in research. The work of the colloquium has an excellent effect in training students to present their ideas in a systematic manner before an auditory.

Among the various lines of investigation now attracting the attention of the physicists the following are preëminent in importance. First, the interrelations between the luminiferous ether and ordinary matter, and the modifications necessary to be made in Maxwell's theory in order to explain the known optical and electrical phenomena of bodies in motion, and that aspect of the theory which deals with the properties of the small electric bodies known as electrons. This portion of mathematical physics is extremely new, and has hardly begun to appear in university courses in this country. Second,

the structure of the atoms of matter, to which the subjects of spectroscopy and the new and fascinating field of radio-activity give the most promising clew. Third, the thermodynamics of radiation in general, which is most intimately connected with the first, and about which a similar remark may be made as to the lack of instruction.

Of branches of applied physics now awaiting the attention of the mathematical physicist may be mentioned meteorology, seismology, and geophysics in general, in all of which the accumulation of experimental data is ahead of the development of theory, to such an extent in meteorology that Professor Arthur Schuster has said that it would be advisable to suspend all meteorological observations for the next ten years, until the theory should have in some degree caught up with the mass of information already accumulated. The theory of meteorology depends on complicated applications of hydrodynamics and thermodynamics; so as to make great demands upon the mathematical physicist, but the field is a rich one to him possessed of the skill to cultivate it. The study of earthquake phenomena is one that is now becoming of great importance in this country, while the investigation of terrestrial magnetism has lately made great advances.

It is almost obvious to the trained investigator that no one can expect to become a physicist of the first rank without a thorough training in mathematical physics, as without that the results of experiment will never be collected into a coherent system worthy the name of an exact science. Furthermore all mathematical physics must rest upon mechanics, the principles of which are of an importance transcending that of any other branch of natural science. It is for this reason that the courses in physics in this department begin with mechanics, and are developed progressively in a systematic manner. They have the advantage of having been deliberately planned for the needs of students of pure physics, as experience has

shown them to be prepared by the various colleges, and of being all delivered by the same person, so that logical consistency and continuity of method are assured. The waste of time often incurred by repetitions of the same subject and of changes of notation by various instructors is thus totally avoided. Attention is called to the fact that no branch of physics is left unprovided for in the course of lectures.

The aim of the department is to insure in its students some acquaintance with all the various fields of experimental physics, to develop in them the power of exact measurement, to accustom them to exact reasoning from experiment to theory, and to encourage original research conducted on a sound basis. To this end students will be put to work in the laboratory upon experiments of sufficient difficulty to give them skill in measurements of precision, and to enable them to become familiar with the precautions and corrections necessary to be employed in exact work. After a sufficient amount of experience has been gained, and the student has shown himself to be possessed of sufficient originality to warrant independent investigation, he will be encouraged to take up for himself an original research in the hope of making a personal contribution to science. In this research he will have at all times the benefit of the direction and advice of the professor.

It should be urged upon intending students to prepare themselves, not only in ordinary laboratory measurements, but also in mathematics, the lack of proper mathematical preparation being a serious drawback to the appreciation of the lectures. In particular may be recommended for study not merely those portions of the calculus which deal with the working out of many indefinite integrals, etc., but the theoretical portions which deal with the ideas of partial derivatives, definite integrals, and their practical manipulation, together with enough analytic geometry to involve the properties of lines and *surfaces* of the second order, and a fair

amount of the elements of determinants. As suitable text-books for preparation may be recommended to the student Lamb's, Osgood's or Gibson's Calculus, C. Smith's Analytical Geometries, and Muir's or Hanus's Determinants. Appell, *Eleménts de l'analyse mathématique* may be very strongly recommended to the intending student for study before and during his course at the University.

It cannot be too strongly urged that the student should, from the beginning, be able to read French and German with ease and to make use of works in them.

REQUIREMENTS FOR THE DOCTOR'S DEGREE

1. The ability to read at sight specimens of scientific French and German, tested before the first of November preceding the Doctor's examination by a committee of two members of the Faculty.

2. The successful passing of an examination upon the general subject of Experimental Physics[1] and upon the subjects named above in the regular course in Theoretical Physics, as a major requirement, together with an examination in one minor subject, *to be determined in each particular case by the head of the Physical Department.* This subject will be Mathematics or Chemistry.

3. The presentation of a satisfactory dissertation, involving a substantial amount of original work, and forming a contribution of value to pure science. The presentation of the dissertation is a prequisite to examination. The time of residence necessary for the proper fulfilment of the above requirements will generally be at least three years, of which at least one will be very largely devoted to work on the dissertation. Students will not be encouraged to enter upon the work of a dissertation until they have acquired sufficient experience to enable them to specialize with advantage.

The aim of the department is to produce physicists rather than electricians, acousticians, opticians, engineers, or narrow specialists of any sort, for although in the nature of things one will be obliged to know more of one subject than of others, yet it seems evident that no thorough knowledge of any branch can be gained without a comprehensive view over the

[1] Every student is recommended to provide himself with Winkelmann's *Handbuch der Physik* as a work for continual reference.

whole subject. Without this the specialist, or the experimentalist lacking a knowledge of mathematics, will continually be falling into pitfalls which the more wary avoid. Furthermore it can be but a detriment to science to encourage research in new fields by immature and ill-prepared minds and hands.

The following statement is here inserted for the benefit of students of mathematics.

The minor in Mathematical Physics consists of the subject-matter of courses 1, 2, 3, and 10, which are intended to constitute the equivalent of five hours a week for one year. Course 10 is given in alternate years to the other courses The subject-matter of the course is contained in Dr. Webster's treatise on *Dynamics* and Riemann-Weber's *Partielle Differentialgleichungen.*

THE LABORATORY

The laboratory occupies three floors of one wing of a large well lighted building free from disturbances, and admirably adapted to the purposes of a physical laboratory. On the ground floor is a room extending across the end of the building forty-five feet long by twenty-two feet wide, with windows on three sides, above which are three similar rooms. A lift running from the bottom to the top floor affords means of transporting apparatus, while its shaft furnishes space for manometer or barometer tubes. In the lower room are four piers with heavy stone tops, and two others below the floor on which can be placed heavy tables.

Also on the ground floor is a large dark room, partially below ground, in which the temperature is tolerably constant, containing a very large and heavy pier. The engine and storage-battery room contains a kerosene engine and dynamo on the same foundation and sixty storage cells of ten amperes capacity, constituting the power-supply. The engine may be started at a few moments notice, even at night. The

storage cells are conveniently arranged so that each one is accessible from each side, from above and below, and the ventilation is excellent, while the room is as light and clean as the work-rooms. Distributing switchboards allow the current from the dynamo or any section of the battery to be supplied to any of the rooms. On the same floor are three rooms constituting the workshop, one of the most important parts of a research department of physics. The first room is devoted to wood-working and pattern-making, and accommodates also a bench for soldering. The next room contains the machinist's bench, two engine-lathes and planer, and the third room a Rivet precision bench-lathe, jeweller's lathe and drill-press. There is no countershafting in the building, each tool being driven by a separate electric motor, while the capacity of the battery is such that for ordinary purposes it is not necessary to drive the engine for the shop alone, so that perfect quiet and steadiness are ensured. In the shop are executed all repairs and alterations of apparatus, and the new apparatus requiring continual experiment is constructed. Most of the principal pieces of apparatus belonging to this department have been thus constructed. In this manner, by having a mechanic always present, an extremely great economy in time and money is effected, and vexatious delays, which would otherwise completely arrest the progress of the work, are avoided. Facilities and encouragement are given to the students to construct apparatus for themselves.

On the main floor are the lecture room, the director's office, the large room used as the director's private laboratory and apparatus room, and three other convenient rooms for research. Two of these are arranged so that they may be darkened for photography, and are also fitted with chemical hoods. The large room on the top floor is diagonally divided into two, one dark and devoted to the Rowland twenty-

foot diffraction grating, and with a photographic dark room attached. The second is utilized for work in sound. There has been recently constructed a storage battery of two thousand small cells for researches requiring a constant source of high potential. This battery is conveniently housed next to the grating room. Every room in the laboratory contains sinks, gas and electric light connections, and several circuits connecting with the switchboard in the battery-room.

The laboratory is well equipped with apparatus for research, besides having the facilities above described for the construction of instruments of any sort needed for that purpose. In addition may be mentioned a large collection of diagrams illustrative of mathematical physics, many of them being originals of the figures in Professor Webster's "Electricity and Magnetism" and "Dynamics," and a number of interesting models used in teaching dynamics, thermodynamics, and electricity. Among them are Maxwell's Dynamical Top and a number of other interesting tops, Maxwell's and Rayleigh's induction models, Gibbs's, van der Waals's and other thermodynamical surfaces. This collection of drawings and models can probably not be matched in this country, and is continually being increased.

The laboratory affords so much space that it is rarely necessary to put more than one student in a single room. Every student receives personal attention in the laboratory from the professor whenever he needs it, and is continually in receipt of instruction and suggestion by personal contact, the best form in which information can be imparted. Emphasis should be laid on the advantage to the research student of the contact with a professor who has no other duties or interests than the furtherance of research, in an institution devoted to this as its main object.

In the library Clark University has one of its strongest features. With a large separate building, administered in the most liberal manner with a view to the advantage of the research student, and with ample funds for the purchase of books, its facilities in the Department of Physics can hardly be surpassed. It may be said to contain all of the most important works in many languages, and is continually kept up to date, any book wanted needing only to be mentioned to be procured. The library is particularly rich in journals, among which are included the transactions of the learned societies of England, France, Germany, Italy, Austria, Holland, and Belgium. Other sets are being continually added. A list of journals will be found on pages 51–56. There are few subjects connected with physics which may not be thoroughly studied in this library.

III. CHEMISTRY

Within the past few decades chemistry has been gradually passing from the larval state of a descriptive science into a higher state of development, the theoretical state. This transition has given to the ancient science, not only a new beauty and usefulness, but also an amazing *will to grow.*

Some liken the new chemistry to a tower in the earliest stages of construction, with a host of men swarming on the scaffolding, busily engaged in adding stone after stone to the promising structure.

From the pure science this intense constructive activity has spread, as might be expected, to the applied branches, notably the American chemical industries. Where twenty-five years ago the chemist was employed, and allowed, to do nothing but routine testing, to-day research laboratories are in active operation, whose members are expected to invent, develop, or improve something somewhere in the processes of manufacture. American enterprise has discovered a way toward the highest utilization of the country's wealth in setting trained ingenuity at work in chemical research laboratories.

The equipment of the industrial chemist, as well as of the competent teacher, must consequently consist, not so much in a memorized collection of formulae and processes, or of heterogeneous information in the chemistry of the manufactures, as in a clear critical understanding of the principles of pure chemical science and in some experience in grappling with difficulties. The desire for *such* knowledge, and the

courage and perseverance necessary in attacking problems, are acquired only through research. And hence *a department of chemistry, particularly a graduate department, must be primarily a department of chemical research.*

With this principle in view, the activities of all members of this Department, both instructors and students, are devoted mainly, almost entirely, to research. The number of lectures is reduced to a reasonable minimum. Students take up research from the first day of their residence in the Department, and are directed to devote about one-quarter of their time to all scholastic work combined, and the remaining three-quarters to research. The investigations in which they are expected to engage are, as a rule, extensive in scope and occupy two years at least, in some cases three years or more. This makes it possible for the student to found his Doctor's degree, not on a perfunctory dissertation, but on a study and contribution that will give him scientific confidence for years to come.

Even the lecture courses, instead of forming descriptive presentations of existing chemical knowledge, are conducted, as far as possible, on a research plan. In the first place, the material of the lectures is derived, not from text-books, but from the original literature, and the student is constantly referred to original communications for accessory study. Then, each topic is approached by the lecturer, not as a chapter in a book, but as a problem in nature. The topic is introduced by an estimate of its importance and of its bearing on other problems. This is followed by an account, on the historical plan as far as possible, of the extent to which the problem has been solved, of how this was done, and of how much is not yet solved, with suggestions as to practical methods by which solution might be obtained. It is believed that such *critical mode* of study is the true characteristic of university work; perhaps the only characteristic

that can keep university lectures from forming a continuance of the teaching of the lower schools, which often permanently impairs the student's most precious possession: his inherited creative instinct.

Specialized courses are offered on topics of history of chemistry, chemical dynamics, heterogeneous equilibria, organic synthesis, stereo-chemistry, electro- and thermo-chemistry, applications of thermodynamics to chemistry, etc., and the student is expected to attend them regularly. To aid students not quite prepared for work of this kind, simpler lecture and laboratory courses will be offered in general inorganic chemistry, organic synthesis and analysis, physical chemistry, etc.

Part of the scholastic work of the department consists in Colloquium exercises, students and instructors alike presenting accounts of current chemical research or, at times, delivering formal lectures on classical achievements of the past, or on the life and life-work of celebrated masters of chemical research.

Finally, several times in course of the academic year (but not oftener than once a month) lectures will be delivered here by active chemical investigators from other institutions—lectures dealing generally with the aims and methods of their own investigations. The Department expects much stimulus from such occasional contact with brilliant and hopeful scientific men.

The research work conducted in the Department runs mainly along the following lines: 1. Experimental and theoretical study of the deviations of fact from accepted principles of *general chemistry;* 2. Experimental study of organic substances and reactions from the standpoint of chemical statics and dynamics: *physico-organic chemistry.* Of course, promising investigations may be taken up, from time to time, along other lines as well.

Instead of more or less insignificant pieces of work being "assigned" to students for their first experience in research, they will be made, if they desire it, *collaborators* of their professor in his own investigations (unless, indeed, they bring forward practicable research projects of their own). Nothing could more certainly assure constant and intimate contact between professor and student and the student's really receiving the best that the Department can offer: individual guidance.

REQUIREMENTS FOR THE DOCTOR'S DEGREE

Strictly speaking, there are no formal "requirements" for the Doctor's degree in this Department. The general University Faculty expects in all cases one year's residence. Otherwise the Department is entirely autonomous in its organization of the training for the degree and in its final estimate of the candidate's maturity. *This imposes upon both instructors and students the duty of zealously guarding the honor of the degree and of maintaining in the Department the highest attainable intellectual standard.*

The time necessary to qualify for the degree of Doctor of Philosophy will depend in each case partly upon the ability of the student, but mainly upon the exigencies of his investigation. Three years will not be too long in most cases.

If the student does not possess, at the time of his joining the Department, a good reading knowledge of both German and French and a working knowledge of analytical geometry and the calculus, he ought to acquire such knowledge as early as possible. Experience shows that students learn a considerable amount of mathematics through the special course in chemical mathematics offered here, and also through the courses in physical chemistry. The Colloquium work invariably leads to improvement of the student's knowledge of languages.

The student is advised and expected not to neglect any one of the great branches of modern chemistry by "majoring" in one of them and "merely minoring" in the others.

The examinations for the degree will consist, on the one hand, in a series of partial tests distributed throughout the candidate's period of residence and, on the other hand, in a general final examination in the several branches of chemical science, including organic and physical chemistry, and chemical statics and dynamics; also in one minor subject *to be determined in each case by the Head of the Chemical Department.*

But the real basis upon which the degree will be conferred will be a dissertation forming, in the opinion of the Head of the Department, a genuine contribution, either purely theoretical or experimental, to chemical science.

If a candidate shall have shown in his research signs of true originality of thought, the Doctor's degree will be conferred upon him *cum laude.*

THE MASTER'S DEGREE

The University does not require an original scientific contribution in connection with the Master's degree. In this Department an applicant is, accordingly, offered free choice between founding his degree on research or on purely scholastic work. It is a pleasure to record that as yet applicants have invariably chosen the former, in spite of being warned that research is uncertain of outcome and more difficult, and might prolong to two years the time necessary for the attainment of the degree.

In the scholastic exercises no qualitative distinction is made between work for the Master's and that for the Doctor's degree in chemistry. The former degree is considered a stepping-stone to the latter.

COURSES GIVEN DURING THE YEAR 1911–1912

A. *Professor Rosanoff's Courses*

1. The Law of Mass Action, Tuesdays and Thursdays at 10.45 to 12.00. First half-year. This specialized course deals almost exhaustively with the methods and results of static and kinetic studies in homogeneous systems. Together with the course mentioned in the following paragraph it is expected to aid the student in acquiring a working knowledge of the modern theory of chemical reactions.

2. Equilibrium and Velocity of Changes in Heterogeneous Systems, from the Viewpoint of the Phase Rule, the Law of Mass Action and the Principles of Thermodynamics. Tuesdays at 10.45 to 12.00 m. and Thursdays at 8.45 to 10.00 a. m. Second half-year.

3. Organic Stereo-Chemistry, Fridays at 4.30 p. m. This course presents an opportunity for a review of several important chapters of organic chemistry, especially the carbohydrates, the structure of benzene and of ethylenic compounds, etc.

4. Colloquium, *directed jointly by the members of the departmental staff*. This is held once in two weeks during the first half-year and once a week during the second half-year, Tuesday afternoons from 4 to 6 or Tuesday evenings from 8 to 10.

B. *Dr. Merigold's Course*

5. The Principles and Methods of Atomic Weight Determinations, Wednesdays at 10 A.M. The object of this course is to acquaint the student with the methods of atomic weight research. A number of classical contributions from Professor Richards' and other laboratories are studied analytically, with especial emphasis on the processes employed in the high purification of inorganic substances.

C. *Dr. Warren's Course*

6. Advanced Organic Chemistry. This course takes up special classes of organic compounds which on account of difficulty are treated superficially, or not at all, in an elementary course. It is the intention to study each topic in detail from the literature. The alkaloids, amino-acids and polypeptides, purine bodies and terpenes constitute the work of the course this year.

ONE CANDIDATE'S EQUIPMENT

In order to give anyone who may be interested some insight into the actual working and results of the arrangements made in the Department, it seemed desirable to make a statement as to the work here of one student, recently graduated:

I. Research

The candidate began his research, dealing with the cause of the relative velocities of certain organic reactions, in October, 1908, and continued the study until August, 1911. The work consisted in precise measurements of reaction velocities, combined with other physico-chemical measurements and preparative organic work. It gave the candidate no little insight into the methods of chemical kinetics and statics.

II. Courses Taken

First Year:

1. The hydro-aromatic series, including the monocyclic and polycyclic terpene bodies (Dr. Rosanoff).
2. Organic stereo-chemistry (Dr. Rosanoff).
3. Special methods of inorganic analysis (Dr. Merigold).
4. Organic synthesis (Dr. Rosanoff).
5. Chemical mathematics (Dr. Story).

Second Year:

6. General and physical chemistry, especially gases, liquids, and solutions (Dr. Rosanoff).
7. Dyestuffs, alkaloids, and polypeptides (Dr. Clark).
8. Inorganic stereo-chemistry; radio-activity (Dr. Merigold).
9. Thermodynamics, with some emphasis on applications to chemistry (Dr. Webster).
10. Supplementary and explanatory course in thermodynamics (Dr. Hubbard).

During his second year the candidate also acted as teaching assistant in organic synthesis in the Collegiate Department (one afternoon a week).

Third Year:

11. The law of mass action in homogeneous systems (Dr. Rosanoff)

12. The phase rule and the law of mass action in heterogeneous systems (Dr. Rosanoff).

13. Constitution of derivatives of benzene, naphthalene, anthracene, etc. (Dr. Clark).

14. Methods of atomic weight determinations (Dr. Merigold).

During the third year the candidate also attended for the second time Dr. Rosanoff's lectures on organic stereo-chemistry and spent a small fraction of his time as Research Assistant in the University Department.

III. Partial List of Papers Reported by the Candidate in Colloquium

1. Jean Rey. "The Increase in Weight of Tin and Lead on Calcination." (Alembic Club Reprints.)

2. Mayow. "Medico-Physical Works." (Alembic Club Reprints.)

3. Priestley. "The Discovery of Oxygen." (Alembic Club Reprints.)

4. Scheele. "The Discovery of Oxygen." (Alembic Club Reprints.)

5. Ipatieff (pyrogenetic researches), *Berichte*, *34*, 596 (1901).

6. Ipatieff (same subject), ibid., 3579 (1901).

7. Ipatieff (same subject), ibid. *35*, 1047 (1902).

8. Perkin and Pickles (synthesis of terpenes), Trans. London Chem. Soc., *87*, 639 (1905).

9. Perkin and Matsubara (same subject), ibid., *87*, 661 (1905).

10. Baeyer (terpenones of the carvone group), *Berichte*, *27*, 1916 (1894).

11. A. A. Noyes (conductivities at high temperatures), J. Am. Chem. Soc., *30*, 335 (1908).

12. A. A. Noyes (conductivity and ionization of polyionic salts), J. Am. Chem. Soc., *31*, 987 (1909).

13. Bredig (osmotic pressure and the Van der Waals equation), *Zeit. physik. Chem.*, *4*, 444 (1899).

14. A. A. Noyes (same subject), ibid., *5*, 53 (1890).

15. Abegg (same subject), ibid., *15*, 254 (1894).

16. Freund, Martin, and Achenbach (action of hydroxylamine on certain derivatives of anthraquinone), *Berichte*, *43*, 3251 (1910).

17. Rabe (on a peculiar connection between the strength and action of acids), ibid., *43*, 3308 (1910).

18. Lecture on the manufacture of essential oils (based largely on Muspratt).
19. Lecture on the Grignard reaction.
20. Account of the life of Lord Kelvin.
21. Account of the life and work of Van't Hoff.
22. Lecture on the results of the candidate's own research.

FACILITIES

The University chemical laboratories occupy a considerable part of the laboratory building. The storerooms contain an unusually large collection of organic preparations, besides all the ordinary inorganic chemicals. The collection of physico-chemical apparatus, including the latest form of Pulfrich's refractometer, an excellent Schmidt and Haensch polariscope, a fine spectroscope, a large Hilger quartz spectrograph, a Burkhardt calculating machine, an Altschul apparatus for measuring critical pressures, specially constructed large constant-temperature stillheads, a set of excellent thermostats, sets of fine thermometers, etc., is sufficient for most ordinary purposes. Whatever special apparatus and chemicals are needed in connection with the work of research are ordered at once, every reasonable effort being made to help the student obtain a maximum of results with a minimum expenditure of time and energy. In this connection it may be mentioned that the Department is at liberty to use the services of the skilled mechanician regularly employed by the Department of Physics. Students will themselves prepare their chemicals, or build their research apparatus, only in those cases in which the Director may consider such work especially instructive to them.

The Director of this Laboratory is Secretary of the Association of American Chemical Research Laboratories, formed at the second decennial celebration of Clark University in 1909. *Inventories of the more important research*

laboratories are kept here, and any chemical needed in an investigation, if not in our own stock, is promptly supplied by some other member of the Association. Such exchange of chemicals by laboratories entitled to duty-free importation has recently been declared by the authorities at Washington to be perfectly legal. It is certainly of the greatest help to members of this Department.

THE LIBRARY

The Library of Clark University has, independently of the other departments, a magnificent endowment of its own. Its chemical collection contains complete files of all the more important journals in English, German, and French, and a rapidly increasing number of general treatises, monographs, and reference works. The income of the library permits of purchasing at once *all* books needed by anyone engaged here in chemical research.

Part of the collection, including the files of the *Zeitschrift für physikalische Chemie*, the *Berichte der deutschen chemischen Gesellschaft*, the *Transactions of the Chemical Society of London*, the *Journal of the American Chemical Society*, the *Chemisches Zentralblatt*, and a number of reference works, forming a small departmental library proper, is kept in one of the laboratory rooms and is accessible to all members of the Department at all times. The departmental library, for the establishment of which the Department is deeply indebted to Dr. Louis N. Wilson, University Librarian, is one of the most valuable aids in the work of both instructors and students. It will be gradually enlarged.

SCHOLARSHIPS AND FELLOWSHIPS

The Department has at its disposal several Scholarships and Fellowships, which will be awarded each year to the

ablest and best recommended applicants. Scholars, and especially Fellows, will coöperate with the Director in maintaining a harmonious and scientific atmosphere in the Department and in promoting all the ends of the University. They will have no duties besides that of making the best use of the facilities for study and research offered to them.

RESEARCHES CARRIED ON IN THE DEPARTMENT SINCE THE INSTALLATION OF ITS PRESENT HEAD, SEPTEMBER, 1907

1. Practical elaboration of a new method for determining the partial vapor pressures of organic mixtures, and determination by means of it of the vapor pressures of a number of typical binary mixtures (published; *crowned by the American Chemical Society with the Nichols gold medal of its New York Section*).

2. A quantitative study of the Victor Meyer Esterification Law and the Steric Hindrance hypothesis (published).

3. A quantitative study of steric hindrances in the esterification of fatty acids (published).

4. Perfection of a precise and rapid method for determining halogens in organic compounds (published).

5. A study of the transformation of aldohexoses into alcohol by ferments, enzymes, and alkalies (uncompleted).

6. A new relationship between the vapor pressures of binary mixtures and a general quantitative theory of fractional distillation (partly published).

7. Experimental study of fractional distillation in the light of the results of the preceding research (ready for publication).

8. A theoretical study of the variation of the vapor composition of binary mixtures with the temperature (ready for publication).

9. A study of the mechanism of iodination in the aromatic series by halogen carriers (uncompleted).

10. A new study of steric hindrances in esterification (ready for publication).

11. A precise quantitative study of the phenomena of direct esterification and ester hydrolysis (ready for publication).

12. A study of the kinetics of certain inorganic reactions (temporarily interrupted).

13. A precise study of the decomposition of tertiary amyl esters (one part ready for publication).

14. A peculiar transformation of benzo-bromamide (temporarily interrupted).

15. An improved method for the preparation of acetamide (published).

16. Definition of an Ideal Gas (in collaboration with Professor Webster; published).

17. A new study of the Duhem-Margules equation (in collaboration with Professor Story; nearly ready for publication).

18. A theoretical revision of some of the principles of the theory of solutions (in progress).

19. A new study of the dynamics of sugar inversion (in progress, one part published).

20. A rapid method for measuring partial vapor pressures (partly published).

21. Limitations of the constant-temperature stillhead (ready for publication).

22. A study of esterification equilibrium in the gaseous state (temporarily interrupted).

23. An improvement of the preparation of para-nitro-phenol (published).

24. Determination of the relative strengths of organic acids (temporarily interrupted).

25. The working of the constant-temperature stillhead in the case of mixtures with maxima or minima in the boiling-point curves (ready for publication).

26. A new lamp, giving an exceedingly intense monochromatic light (ready for publication).

27. A study of certain reactions and derivatives of fumaric acid.

IV. BIOLOGY

The aim of the department is to develop investigators well grounded in the history, principles, problems and methods of modern biological science. Since the first step in any research is a knowledge of all that has been learned on the subject to date, the library of the department has been selected with a view to the best classical monographs, texts, journals and especially complete sets of indexes, Jahresberichte and Centralblätter, from which a complete bibliography of any subject can quickly be obtained. Both lectures and laboratory work in the courses described below are especially designed to facilitate practical acquaintance with the methods and apparatus of research, and, as soon as practicable, each student is expected to begin a piece of original investigation. The laboratories are equipped with standard apparatus of most approved types, and if new work requires specially devised apparatus, every effort is made to obtain it. It is thus the aim of the laboratory to place at the disposal of those interested in the solution of biological, physiological and neurological problems the best possible facilities for the prosecution of their work.

The field of modern biological science is so broad that laboratories as well as men are obliged to specialize. The department has for the past few years undertaken to work out a series of problems in the dynamics of living organisms, studies on the activities of animals and plants. Instead of confining attention to structure and form, the attempt has been made to gain an adequate expression for species

as forces in nature. This is distinctly a new point of view, and when we ask such questions of a species as: What do you do? What is your work in the economy of nature? What is your daily life? Your rhythms of work and rest? Do you sleep? Do you play? Do you adapt yourself intelligently or mechanically to your environment? What relation has your work to human interests? What are the conditions of your highest vigor and efficiency? How will this or that change in your environment affect your life? How do you vary?—when we ask these questions of the commonest species, we find ourselves on new ground, alive with new and vital problems.

In this large field studies of the daily life of a series of animals—amœba, vorticella, hydra, earthworm, crayfish, toad, rat, bobwhite—have yielded most valuable results, and other forms equally interesting await study. Another line which is possibly of even greater promise, is the investigation of the effects of different conditions, foods and drugs, exercise, infections of various kinds, on the vigor of the germ plasm and consequent stamina and viability of offspring. Several researches have been made and are in progress and many more are projected in this field.

It is high time that university biology began to concern itself with problems of the adequate control and protection from extinction of valuable American species. Work on the biology of the ruffed grouse, sharp-tailed grouse and bobwhite has been in progress for several years past, a plan to save the passenger pigeon from total extinction has been developed and, if any still remain, gives hope of proving effective; and plans have been sketched for similar studies on the wood duck and woodcock, two other "vanishing species," prairie chicken, wild turkey, wild swans, geese and other water-fowl, and several species of plover whose extinction is imminent. The biology of all these species, and many more,

must be worked out in detail so that we can know and teach generally the conditions under which the perpetuation of each and every valuable American species may be assured.

Along with the above considerable attention has been given to organization of biological instruction through the public schools, high school, college and university.

The above will serve to explain briefly the courses offered below.

1. Dynamic Biology and General Physiology. It is proposed to combine in this course the fundamental laws and principles of biological science, the emphasis being placed on the functional or dynamic side rather than on the side of morphological structure. In other words, the point of view of the course is that living species have assumed certain forms and have developed definite structures in order to fit them to perform a certain work in the economy of nature. The first half-year is devoted to the study of a typical series of animals as forces in nature, special attention being directed to American problems and to the methods and apparatus by which dynamics of species may be investigated. On the side of biological theory, which occupies the last half of the year, among others the following topics will serve to outline the scope of the course. Origin and constitution of living matter. Physiological functions. Classifications of plants and animals. Biological reactions, tropisms, experimental morphology. Differentiation of organs. Growth and reproduction. Heredity. Variation. Dr. Hodge, two lectures weekly, October to June. Laboratory work will be arranged to meet the needs of individual students. 1912–1913.

2. Evolution and Heredity, History, Theories and Data. This course will aim to present the main outlines as any student of modern science should have them from the Greek evolutionists through Bonnet, Lamark, the Darwins and down to the present. Hereafter this course will be divided into a three year cycle as follows:

I. Data of Evolution. The aim of this course is to marshal the concrete evidences from Comparative Anatomy, Embryology and Paleontology and Geographical Distribution in support of a phyletic sequence in the development of animal types. The course will be well illustrated with charts and specimens. Dr. Miller, one lecture weekly, February to June, 1914.

II. Heredity. History and theories and especially the experimen-

tal data which have accumulated in recent years. Special attention will also be given to human inheritance. Dr. Miller, one lecture weekly, February to June, 1912.

III. History of Evolution. The object of this course will be to present in chronological order development of ideas and theories of evolution from the Greek to present times. Dr. Miller, one lecture weekly, February to June, 1913.

3. Animal Behavior. This course, the materials for which have been collecting for several years, will deal with the normal, biological reactions of a series of typical animals as a basis for experimental work in comparative psychology. It may also serve to suggest to psychologists many problems both for research and for observational study in the laboratory. On the purely biological side we are beginning to see that control of animal life in all its many phases from domestication of species to extermination of undesirable forms depends for success upon a knowledge of the laws and principles of animal behavior. This phase of zoölogy is thus closely related to the economic and will draw naturally from the researches of the scientific departments of the government, the data of which have never before been gathered together and presented from this point of view. The course will be illustrated by living specimens, so far as possible, and by a complete series of charts already in the possession of the department. Dr. Hodge, two lectures weekly, from October to February, 1912–1913.

4. Biological Instruction. The aim of this course will be to present the results of the Conferences on Biological instruction held in connection with the Second Decennial Celebration of Clark University, and to develop a plan for the organization of such instruction throughout the entire system of education. It will discuss briefly first biological nature study in the elementary schools, consider the problem of the high school course, the history and development of the college course and close with the history, aims and methods of biological research and its present organization in universities and research institutions. Dr. Hodge, two lectures weekly, October and November, 1912.

5. Special Biological Lectures. In this course all members of the Department are given an opportunity to present in lecture form topics—reviews of books and important investigations and particularly results of their own researches. About one lecture weekly, throughout the year.

It is intended to arrange the course in such a manner that the general field may be covered in two years. This will leave the student free to devote his entire time during the third year to special study in the literature of the science and to the prosecution and completion of his thesis work. Accordingly, a two-year cycle will be arranged as follows:

6. Comparative Study of Nervous Systems and Sense Organs. This course will form the natural anatomical background for comparative psychology and together with the working out of a minor problem may well constitute a minor for one whose major is psychology or philosophy. On the biological side it will be closely correlated with general physiology and morphology. It is intended to begin with a comparative study of structural elements of the nervous system of both invertebrates and vertebrates and then correlate and compare the different degrees of complexity of function with the anatomical organization found in the ascending series. The course will be illustrated throughout by diagrams, models, dissections and microscopical preparations and experiments. Laboratory work one afternoon weekly, or arranged to meet the needs of individual students. One hour weekly, for general class exercise, or its equivalent.

7. The Human Nervous System and Sense Organs. This course will deal with the anatomy, both gross and microscopic, and with the physiology and hygiene—fatigue and sleep, growth and development, brain localization. One hour weekly, or the equivalent. Laboratory one afternoon a week, or arranged to meet the needs of individual students.

By way of supplementing the above and courses in other departments of the University, three special courses have been planned as follows:

8. Practical Histology. The course will be a laboratory course, with such lectures, directions and conferences as may be required by those taking it. It will be arranged practically to meet the needs of

[1] Negotiations are under way to secure a special instructor to take charge of these courses.

individual students. Considerable latitude will be given, so that any who wish may make it a comparative study by way of supplementing courses 1, 3, 4 or 5, prepare a series of demonstrational specimens for themselves, or devote their time to special problems.

9. For those who do not take work in the laboratory, but desire to see the actual specimens and experiments, a course of demonstrations to run somewhat parallel with the above courses will be offered. One hour weekly, through the year.

EXPERIMENTAL WORK

Laboratory work in biology, physiology, histology, and neurology is arranged to meet the needs of individual students. In case one has not decided on a special line of research, the resources of the department are such that he will be given a fairly wide range of problems from which he may select a subject suited to his tastes and attainments. A course in biology such as is given in our best colleges and State universities is sufficient to enable students to begin work here.

A long-felt need of the department is now supplied in the possession of land well adapted and conveniently located for biological research. Ideal facilities can now be offered for the study of daily rhythms, life and work of species under natural conditions; and also for experiments in animal and plant breeding. It is proposed to organize an extended series of researches upon the effects of different chemical substances and conditions of life upon the viability and vigor of the germ plasm.

While no regular laboratory fees are charged, each student is expected to refund to the laboratory the cost price of all the more expensive reagents, including alcohol, ether, chloroform, formalin, celloidin, and the like. Each student must supply his own microscopical glass, slides and covers, and must pay the cost price of all glassware that he breaks. All students are expected to take the best possible care of all

apparatus entrusted to their charge, and to return it to the laboratory clean and in good order.

The Journal Club meets weekly, for the purpose of reporting and discussing important articles in the current periodicals.

The Biological Seminar devotes one evening weekly throughout the year to special papers upon topics in the historical development of the science and to the reading and discussion of classics in biological philosophy and research.

V. ANTHROPOLOGY

DR. CHAMBERLAIN will lecture twice a week throughout the year. The courses offered endeavor to cover the following field:

GENERAL ANTHROPOLOGY, embracing: (a) History, scope and relations of the science. (b) PHYSICAL ANTHROPOLOGY; problems, investigations, results, laboratory work. (c) ETHNOGRAPHY; races and race-origins. (d) ETHNOLOGY, INCLUDING SOCIOLOGY; origins and development of the arts and sciences, institutions, ideas and ideals of man and the races of man, human civilizations, their origin and development. (e) MYTHOLOGY; folk-lore, religions. (f) LINGUISTICS; race and language, origin and development of language and of languages, psychology of language, gesture-speech and written language, comparative linguistics, comparative literature. (g) CRIMINAL AND PATHOLOGICAL ANTHROPOLOGY; physical and mental, ethnic morals. (h) HISTORICAL AND ARCHEOLOGICAL; primitive man and primitive culture, the precursors of man.

SPECIAL ANTHROPOLOGICAL TOPICS most akin to Psychology and Pedagogy, embodying the results of the most recent and important studies and investigations of the following and other subjects, particularly: The Characteristics in the Primitive Races and their Rôle in Human History; The Physical Anthropology of Infancy, Childhood, Youth, Manhood, Old Age; the Anthropological Phenomena of Growth, Arrested Development, Degeneration; Anthropological Aspects of Heredity and Environment in the Individual and in the Race; Uncivilized Races and Civilized Races; the Phenomena of Race-Mixture; the Evolution Problems of Humanity; Education among Primitive Peoples; the Anthropological History of America; the Interpretation of Folk-Lore; the Psychology of Primitive Peoples; the Trend of Human Progress; the Psychology of Primitive Languages; the Mind of Primitive Man and its Expressions; the Development of Human Personality; the Rôle of the Individual in Primitive Culture; Progress and its Criteria; the Orient and the Occident in their Relations to Human Evolution; the Negro in Africa and in Amer-

ica; the American Indian; the Anthropology of Japan and China; "World Languages" and "World Culture."

The lectures in Anthropology will have special bearing upon the courses in Psychology and Pedagogy in the University, and every effort will be made to utilize the latest results of Anthropological investigations.

From time to time, the most valuable current literature will be reviewed and students made acquainted with the best contributions to Anthropological Science in the various foreign languages. An annotated Bibliography of the "Periodical Literature" of Anthropology, by Dr. Chamberlain, is published yearly in the *American Anthropologist* and the *Journal of American Folk-Lore*. Reference may be made also to the article on "North American Indians," in the new (eleventh) edition of the *Encyclopedia Britannica* for orientation concerning one of the primitive races of man. The importance of a thorough acquaintance with the bibliography of their subjects is impressed upon all students, and all possible assistance in this direction is always at their disposal.

VI. PSYCHOLOGY

A complete course in Psychology at Clark University includes the following subjects:

1. Anatomy and Physiology of the Brain and Spinal Cord, sense organs, and other parts of the body, especially the muscles—the organs of the will—in so far as they are concerned with mental processes,—together with a good general background of biology. For this a special laboratory is equipped. See Dr. Hodge's announcement.

2. Physiological and Experimental Psychology, including an outline of the anatomy and physiology of the central nervous system and sense-organs; the elementary sense-experiences; sensation and perception; the measurement of sensational intensity; space; time; reaction-times; affection and emotion; memory; association; attention; apperception; will; the "higher mental processes;" inter-relation of mind and body. For this a special laboratory is equipped. See Dr. Baird's announcements.

3. Comparative and Genetic Psychology. Review of the general doctrine of evolution as a basis for the evolution of mind. Discussion of experimental and observational studies upon typical forms of animal life, beginning with the protozoa. Instincts; animal and human infancy. Childhood and adolescence. See announcement of Drs. Hall, Baird and Porter.

4. Abnormal and Morbid Psychology, as nature's experiments, *e. g.*, border-line phenomena as seen in neurotic subjects, prodigies, and geniuses; defectives, such as the blind, deaf, criminal, idiotic; mental and nervous diseases, epilepsy, phobias, neurasthenia, hysteria; morbid modifications of will, personality and emotion, etc. Special clinical facilities for this work are open to the department in the hospitals and other institutions of the city. See Dr. Hall's lectures and Dr. Cowles' lectures and clinic.

5. Anthropological Psychology; myths, customs and belief, comparative religion and psychology of religion, primitive art, and the study

of the life of savages and children; adolescence and senescence; physical measurements illustrating laws of growth in size and power, etc. See Dr. Chamberlain's courses.

6. ÆSTHETICS AND ETHICS, the psychology of music, painting, literature, the phenomena and laws of volition and morality.

7. HISTORY OF PSYCHOLOGY AND PHILOSOPHY, including the chief culture institutions, science, medical theories, Christianity, and education generally. Dr. Hall's historical courses and seminary.

8. APPLICATIONS OF PSYCHOLOGY, PEDAGOGY, including mental and moral hygiene and regimen, school organization and methods from kindergarten to university; the sex problem; defectives, etc. Dr. Hall's and Dr. Burnham's courses.

9. THE PSYCHOLOGY OF SEX; lessons from the aberrations of this instinct; some of its normal phenomena; the current theories; psychic differences between men and women; education of girls; fatherhood, motherhood; instruction of the young in matters pertaining to sex; theories of Freud, Moll, Ellis, etc.

10. THE PSYCHOLOGY OF BORDER-LINE PHENOMENA, including spiritism, telepathy, hypnotism, dreams, multiple personality, somnambulism, crystal gazing, dousing, mind reading, sleight of hand performances, major symptoms of hysteria, psychotherapeutics and mind cure, methods of psychological analysis, etc.

The aim of the Psychological department is to cover this field as well as its instructors are able to do so in two or three years.

EXPERIMENTAL PSYCHOLOGY

The primary purpose of this department is to train students for the investigation of psychological problems. The lecture courses and the Journal Club aim to familiarize the student with the history and the present status of psychological experimentation; the laboratory courses are arranged with a view to training him in experimental procedure, and equipping him for independent research.

LABORATORY

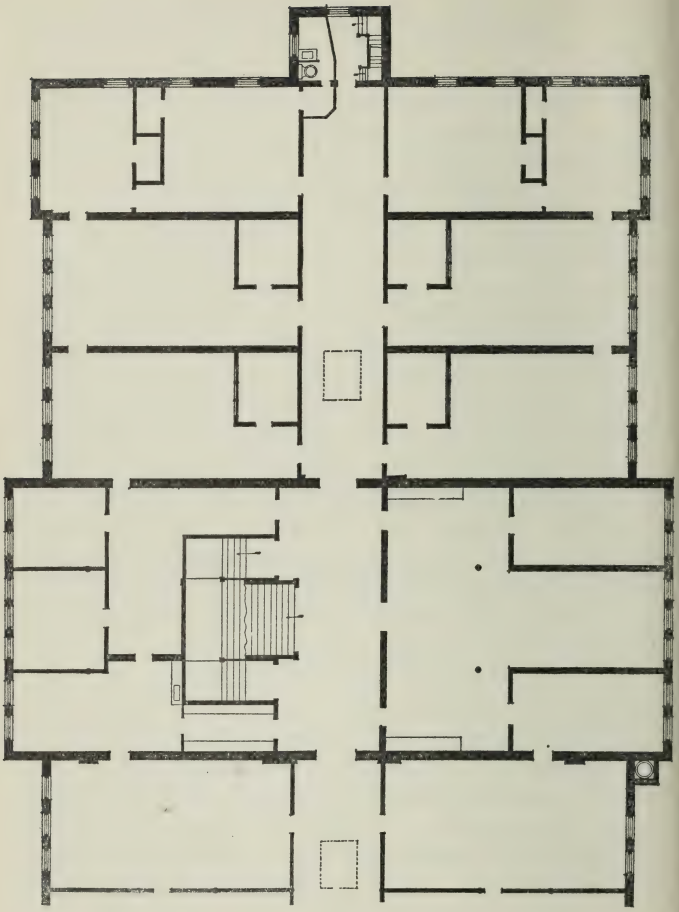
The psychological laboratory occupies a suite of twenty rooms on the upper floor of the main building of the university.

These rooms, as at present arranged, are devoted to the following purposes: office, lecture-room, seminary and reading-room, dark-room, work-shop, general apparatus-room, and a group of rooms for research.

The laboratory is well equipped with general apparatus; and it has an annual appropriation sufficient to provide for the purchase and manufacture of such apparatus as is required from time to time for special investigations. The work-shop contains power- and other lathes, a power-drill, and an abundant equipment of tools and materials for the manufacture and repair of apparatus. The services of an expert mechanician are available; and every facility is provided for the devising and constructing of apparatus appropriate for the solution of such special problems as are undertaken.

The library contains an unusually large collection of psychological literature. It is especially well supplied with scientific periodicals and proceedings of learned societies. Since the enrolment of the department consists exclusively of graduate students, and is, therefore, relatively limited in numbers, it is possible to give to each student of the department a maximum of freedom in the use of the library. Besides having access to the university library, students of the laboratory have at their disposal an excellent working-library of psychological books and periodicals which are shelved in the seminary-room.

The more general and fundamental courses of lectures in the department are repeated each year, while the more advanced and specialized courses are given only in alternate years. A feature of the method of instruction at Clark University is the frequent informal conferences between instructor and student. The Journal Club meets weekly (two-hour sessions) for the discussion of the current literature. The more valuable contributions presented by the members of the Club will be published in the *American Journal of*



PSYCHOLOGICAL LABORATORY

Psychology. The laboratory work includes an introductory and a research course. The former is designed to familiarize the student with the efficient handling of apparatus, and to acquaint him with the methods to be followed and the precautions to be observed in psychological experimentation. This course is repeated each year; it, or its equivalent, is a prerequisite to all other work in the laboratory. The research varies from year to year.

Provision for Comparative Psychology is now made at the Hadwen Arboretum, about fifteen minutes' walk from the main building of the University, where special facilities for the care of the animals have been provided.

The following courses are announced for the academic year 1912–1913.

DR. HALL'S COURSES

DR. HALL will probably give the following courses next year, although variations from this programme may be made if there is reason to believe that the greatest good of the greatest number of students will be thereby promoted:

1. THE HISTORY OF ANCIENT PHILOSOPHY. This course, while embodying most of the general material and literature upon the subject, will be treated rather from the point of view of natural history or anthropology. The reasons will be sought for each philosopher, why and how he came to his own views, and the culture history standpoint will be stressed. The lectures in the history of philosophy will be given from the point of view that the great systems rarely say what they mean, but have to be interpreted in the larger light of history and in ways not entirely unlike those used by psycho-therapy. This course is part of a larger one extending over two of three years, covering the entire history of philosophy, ancient and modern.

2. THE PSYCHOLOGY OF RELIGION. This, too, is part of a larger course comprising primitive religions from animism and fetichism up, the great ethnic religions including Judaism and Christianity, ending with the course on the psychology of Jesus.

3. The Psychology of Jesus based on the latest critical and historical studies.

4. Psychogenesis. A general outline of this field with summaries of literature to date.

5. Some Vital Problems of Education. This course is given Saturdays for teachers and the special field it covers will be announced later.

6. The Seminary, at Dr. Hall's house, three hours every Monday evening through the year.

7. Researches with individuals on special topics.

DR. BAIRD'S ANNOUNCEMENT OF COURSES

1. General Psychology. A course of lectures and demonstrations dealing with sensation, affection, attention, volition and perception. This course will present, in concrete and systematic form, the more important facts that have been yielded by the experimental investigation of the simpler mental processes, together with a discussion of theories that have been advanced from time to time. *Two hours a week. First semester.*

2. The Psychology of Memory, Imagination and the Process of Learning. Lectures and demonstrations dealing with the phenomena of mental acquisition and retention; imagery, association and reproduction, the phenomena of learning and forgetting, the function and development of habits. *Two hours a week. Second semester.*

3. The Psychology of the Higher Intellectual Processes. The psychology of meaning, abstraction, thought, judgment, reasoning; the function and significance of imagery; the phenomena of *Einstellung* and *Bewusstseinslage. One hour a week. Second semester.* (This course will be offered in 1913–1914 and in alternate years thereafter.)

4. Psychological Systems. A statement and discussion of the characteristic features of the systematic doctrines embodied in the writings of Angell, Calkins, Ebbinghaus, James, Kuelpe, Muensterberg, Titchener, Wundt and others. *One hour a week. Second semester.* (This course will be offered in 1912-13; thereafter it will alternate with Course 3.)

5. Journal Club. A seminary for the informal discussion of current psychological literature. Meetings are held weekly throughout the year.

6. Introductory Experimental Course. In this course the

student will perform a series of standard psychological experiments, chiefly for the purpose of mastering the technique of experimentation. The course will be given by Dr. Baird, Dr. Weld and Mr. Finkenbinder. *Four to six hours a week, throughout the year.*

7. Research Course. Under this title are grouped the special investigations undertaken by students in the laboratory. *Topics and hours to be arranged.*

DR. PORTER'S ANNOUNCEMENT OF COURSES

1. Animal Behavior. Lectures on the tropisms, reflexes, instincts and mental processes, particularly the learning process of animals. The social insects, ants, bees and wasps, and the gregarious higher animals, birds and mammals, will be chiefly dealt with during the first half of the year. By this means an attempt will be made to satisfy the interests and needs of students chiefly concerned with human societies.

For methods of investigation and interpretation as well as results the works of such writers as the following will be reviewed and discussed: Forel, the Hubers, Wheeler, Bethe, Wasmann, von Buttel-Reepen, the Peckhams, Fielde, Lubbock, Plateau, von Uexküll, Espinas, Darwin, Lloyd Morgan, Washburn, Thorndike, Jennings, Loeb, Yerkes, Watson and others. The final aim of the course is to give as adequate a review of the nature and evolution of mental processes in animals as our present knowledge will allow. Diagrams, lantern slides and apparatus will be used by way of demonstration. One hour a week.

2. Social Psychology. In this course the following are some of the topics considered: the psychological views of early writers such as Comte, Spencer, Lewes, Tarde and others; the nature and laws of "social mind"; the facts and generalizations of Child-Psychology as determining the point of view and methods of Social Psychology; human instincts and intelligence and their rôle in human society; the origin and development of social laws; heredity and social heredity; suggestion and imitation; brief reference to the development of languages, myth, and religion as illustrative of laws of social and mental evolution. Sociological and historical facts are considered from the psychological and genetic points of view. Besides the monograph literature, the works of such writers as Tarde, Davis, Ross, McDougall, Cooley, Wundt, Royce, Baldwin, Woods, Thomas and others are used as references. One hour a week for the second half-year.

At the Hadwen Arboretum, where a "station for the study of animal behavior" has been established and is now under Dr. Porter's direction, are found facilities for the study of certain forms of animal life; and here too will be found some of the illustrative material for his lectures.

The following courses offered by Professor James P. Porter in Clark College are open to students in the University:

1. General Psychology. Three hours a week, throughout the year.

2. Genetic and Applied Psychology. Two hours a week, throughout the year.

3. Laboratory Course in Experimental Psychology. Two hours a week, throughout the year.

Psychiatry

Dr. Cowles, lecturer on Psychiatry, former head of the McLean Hospital at Waverley, Mass., will give a course at the University and clinical demonstrations at the Worcester Insane Hospital. Dr. Cowles's course includes the following topics:

1–2. The Dependence of Psychiatry upon Mental and General Physiology; the concept of energy fundamental; the reflex arc and integrative action of the nervous system. Relation of inhibition to anabolism, to external function and katabolism.

3. Conduction-Paths and Threshold Values: changes in physiological conditions in relation to the determination of psychical effects,—normal habit,—overuse and disuse,—mental symptoms.

4. The Physiology and Pathology of Emotion; depression and exaltation figurative expressions in psychology, both being excitative and katabolic; relations of feeling-tone to conditions of ill-being.

5. Psychasthenia and Neurasthenia; the minor psychoneuroses—psychological automatism, fixed ideas, hysteria.

6. Mental Symptoms of Nervous Exhaustion; their genesis in reductions of functional capacity of the nervous and mental mechanism.

7–10. The Melancholia-mania Group of Neuropsychoses (not tending to dementia).

11–20. The Deteriorating Psychoses:—dementia praecox, general paresis; senile dementia. Involution psychoses; paranoia.

Dr. Cowles's lectures are open without fee:

(1) To all members of the Faculty of the University and College;

(2) To all members of the Psychological Department, and to members of the College who are taking other psychological courses in the University.

The fee for all other persons is $10.00.

VII. PEDAGOGY

This department offers a course which can be taken for the degree of Doctor of Philosophy. Its work is in the closest connection with that of psychology and anthropology, and in part based on these subjects. The work in this department is intended to meet the needs of the following classes of students.

First. Those intending to teach some other specialty but who wish a general survey of the history, present state, methods, and recent advances in the field of university, professional and technical education.

Second. Those who desire to become professors of pedagogy, or heads or instructors in normal schools, superintendents, or otherwise to become experts in the work of education.

The programme of the Pedagogical Department includes courses upon the following subjects:

1. (*a*) Child Study. (*b*) Pedagogical Psychology. (*c*) Experimental Pedagogy. (*d*) School Hygiene.

2. (*a*) Principles of Education. (*b*) History of Education and Reforms. (*c*) Methods, Devices, Apparatus, etc.

3. (*a*) Organization of Schools in Different Countries. (*b*) Problems of College Education. (*c*) The Teaching Profession. (*d*) Motor Education, including manual training, physical education, etc. (*e*) Moral and Religious Education. (*f*) Ideals.

The courses in pedagogy for 1912–1913 will be as follows:

DR. WILLIAM H. BURNHAM'S COURSES

A. The Hygiene of Instruction. The conditions of brain activity. Mental hygiene. The laws of nervous activity in relation to problems

of instruction. Fatigue. The period of study. The hygiene of the kindergarten. The hygiene of spelling, reading, writing, arithmetic, manual training, physical training, etc. The hygienic aspects of grading, of examinations, of discipline, of punishment, etc. *One hour a week, throughout the year.*

B. The Teaching Profession. The essential characteristics of a learned profession. The teacher and the parent. The teacher and the artisan. The teacher in ancient civilization; in China, India, Greece, Rome, etc. The medieval teacher. The teacher of the early Renaissance. The Reformation. The great modern schoolmasters, Sturm, Comenius, F. A. Wolf, Pestalozzi, *et al.* The teaching profession in Germany. The function of the teacher in social evolution. The functions of the teacher in the schoolroom. Characteristics of the teaching profession as a social group. Fundamental principles concerning the training of teachers. Different plans tried in this and other countries, especially in the training of secondary teachers. The hygiene of teaching. *Once a week, throughout the year.*

C. Seminary. The work will be determined in part by the needs of the students who elect this course. It will probably be devoted chiefly to some phase of the history of education or to the literature of educational psychology. It is hoped, also, that each student will select, after consultation with President Hall and Dr. Burnham, a topic for special investigation. The results of such studies may be published. *One or two hours a week, throughout the year.*

PRESIDENT G. STANLEY HALL'S COURSE

Includes:

1. The Genetic Basis of Education, or what each stage of child development requires in matter and method. This course will summarize the results of child study in so far as they have a bearing upon principles of education. The course will involve some survey not only of schools and their work, but of child welfare agencies generally.

2. Higher Pedagogy, or the principles and practice of education in college, university, law, medical, theological and technical schools, the endowment of research, learned academies, etc.

3. Experimental Pedagogy. This course next year will be selected according to need from these subjects.

DR. EDMUND C. SANFORD'S COURSE

THE PROBLEMS OF COLLEGE EDUCATION. A discussion of the most important questions of college efficiency with especial reference to present day tendencies and criticisms. *One hour a week throughout the year.*

DR. CAPEN'S COURSE

During the past year Dr. Samuel P. Capen has given a course of lectures on The Principles of School Administration with special attention to the French and German school systems. A similar course will be given during the academic year 1912–13. *One hour a week, half a year.*

THE CHILDREN'S INSTITUTE

The Children's Institute, under the auspices of the Educational Department of Clark University, provides courses of lectures each year upon at least some of the following topics.

(*a*) A general survey of child welfare institutions in this country and abroad with the use of demonstrative material in the form of reports, circulars, etc., by Dr. Theodate L. Smith, who also gives practical aid in the preparation of theses touching this subject.

(*b*) A course on the examination and treatment of subnormal and defective children with clinical demonstrations, given this year by John M. Fletcher.

(*c*) A course in experimental pedagogy including the questionnaire and statistical methods and a survey of the history and literature, by Dr. Amy E. Tanner.

The Children's Institute has a large hall with three adjacent rooms, including one entire floor in the new Library Building devoted to an educational museum, which is equipped with hundreds of maps, charts, diagrams, illustrative and other apparatus gathered from many countries, to ease the

work of teaching and make it more effective. This material is used in various departments, but especially by that of Education.

Special attention has been given to the collection of the circulars and other publications of nearly one hundred types of child welfare organizations with which the department seeks to keep in touch.

A child conference lasting a week was held at which more than two score experts read papers, which are now printed in a volume of 286 pages.

The courses as announced above may be modified somewhat as the needs of the students or other circumstances may require.

The library of the department has a large collection of Educational Literature, being especially rich in German and French literature, and having a large number of official reports from various countries—English, French, German, Belgian, Swedish, etc.; also town and city reports, and reports of special institutions; and a collection of French, German, and American text-books.

The books are arranged under the following heads:

1. General.
2. History of Education.
3. Educational Systems.
4. The Theory of Education and Special School Subjects.
5. Educational Psychology.
6. Child Study.
7. School Hygiene and Physical Education.
8. Text-Books.
9. Miscellaneous.

Many of the more common educational books are accessible in the Worcester Public Library and have not been duplicated by the University. The large collection of educational text-books in the library of the American Antiquarian Society

and its valuable historical material are also accessible to the University.

The collection of educational periodicals includes a large number of the best foreign journals—English, French, German, Swedish, etc.

The nucleus of an educational museum has been formed. This is now merged with the museum of the Children's Institute, and contains a valuable collection of educational apparatus, pictures, illustrative material for language lessons, *Anschauungsunterricht*, toys, kindergarten material, maps, charts, diagrams, text-books, lantern slides, moving picture films, photographs, and illustrative material of various kinds in school hygiene, history, arithmetic, language, the natural sciences, etc. One room contains a collection of apparatus for the teaching of arithmetic, abacuses of various kinds, charts for counting, reckoning machines, number tablets, weights, measures, geometrical models, and astronomical charts and apparatus. Another room contains a collection of toys from different countries, a number illustrating scientific principles in physics and the like. A third room is devoted to apparatus and illustrative material in school hygiene. The collection includes seats and desks, charts illustrating good and bad posture, hygrometers, apparatus for ensuring cleanliness, for testing the air, charts illustrating the incidence of school diseases, the effects of antitoxins, etc. and a collection of the antitoxins for the various diseases. The main room is largely filled with pictures, models, maps, charts, and illustrative material for teaching the different school subjects and the different sciences. This museum is open to students, teachers, and others at definite times. It is now under the direction of Professor W. H. Burnham.

The *Pedagogical Seminary* is a journal issued at the University, and serves as a convenient medium of publication for special investigations undertaken in the department.

In addition to the members of the University, special students are admitted during the year to the Saturday courses of Drs. Hall and Burnham in Education, for a fee of $20.

VIII. ECONOMICS AND SOCIOLOGY

The courses here outlined indicate the scope of the work offered. Two courses of one hour each per week and a seminar are given each year.

1. Recent Economic Theory. This course is devoted to a comparative study of the theories of Marshall, Clark, Böhm-Bawerk, Fetter, Hobson and Carver, as presenting leading types of modern economic theory. The chief emphasis is placed on the problems of value and distribution; on the tendencies toward monopoly and other interferences with normal adjustments; and on the influence of the growth of co-operation and consolidation. This course should be preceded by at least an elementary study of economic theory. Given in 1911–12.

2. Principles of Interpretation in Sociology. This deals with the various principles that have been used to interpret history and society. Various viewpoints and principles are taken up in turn, analyzed, their advantages and limitations discussed, and the results achieved by each indicated. Among those studied are: anthropo-geography; the philosophy of history; the great man theory; the economic interpretation of history; social economics; philanthropy; biological and organismic conceptions; the struggle of races; the division of labor; human interests; social control; imitation; social psychology; and like response to stimulus. Given in 1911–12.

3. Economic and Social Statistics. The first part of this course deals with various phenomena of population, such as births, deaths, marriages and divorces; and with wages and prices. The second part is an introduction to the statistical methods based on the theory of probabilities. In this some attention is given to the work of Galton and Pearson and other studies bearing on eugenics.

4. Seminar. During the current year the seminar has, in addition to reports on theses and some of the recent literature, made a study of the problems and results of eugenics.

IX. HISTORY

Dr. Blakeslee offers the following courses:

1. United States History. Different periods will be taken for intensive study in successive years. In 1910–11 the course dealt with the history of the United States from the Missouri Compromise to the outbreak of the Civil War, with emphasis upon the years following the Compromise of 1850. It treated especially the institution of slavery as it existed in the Southern States, the origin and growth of the abolition sentiment, the doctrine of states rights, and the development of the antagonism between the North and the South till its culmination in the Civil War. In 1911–12 it covers the period from the close of the Civil War to the present time, and includes the economic and social development of the country during these years as well as the history of politics. The lectures are supplemented by reports presented by students upon assigned topics. *One hour.*

2. International Law. The aim of this course will be to give a knowledge of the general principles of International Law. So far as possible definite cases will be studied, and for that purpose Scott's "Cases on International Law" will be followed. Especial attention will be paid to the legal questions involved in the existing international controversies; to the history and present status of arbitration; and to the modifications in International Law introduced by such international Congresses as those held at the Hague. The study of the leading authorities and of cases will be supplemented by lectures and discussions. *Two hours.*

3. English History—The Period of the Tudors and the Stuarts. This course will extend from the accession of Henry VII, in 1485, to the death of Queen Anne, in 1714, and will deal especially with the establishment of practical absolutism under Henry VII and Henry VIII; the rise of Protestantism; the development of Puritanism in state and church; the great Civil War; Cromwell and the Puritan ascendency; the attempts to form a firm constitutional government; the relation of English Puritanism to that of Switzerland and New England; the restoration of mon-

archy; and the final triumph of Parliament in the overthrow of James II. Emphasis will be placed upon the study of the constitutional documents and other sources. *Two hours.*

4. The History of the Christian Church—From the Days of the Apostles to the Close of the Reformation. The leading topics considered will be: the pre-Constantine church, including the persecutions and the formation of a definite ecclesiastical organization; the effects upon the church of Constantine's conversion; the Nicene creed and the early heresies; the conversion of the barbarians and its reflex action upon the church; monasticism; the rise of the Papacy; the mediaeval church at its height; the rise of heresy—Wyclif, Huss, Savonarola; the reformation—Luther, Zwingli, Calvin; the Catholic Reformation; and the religious wars of the sixteenth and seventeenth centuries. *Two hours.*

5. Russia. The lectures discuss particularly the revolutionary movement, including the abuses of autocracy and bureaucracy, the character and methods of the revolutionists, the economic and political ability of the peasants, the widespread acceptance of socialism by the educated classes, the influence of the church, and the recent reforms by the government. *One hour. One Semester.*

6. The Far East. The lectures deal with Russia in Asia; Japan, with its colonies, Formosa and Korea; Manchuria, including the history and present status of the struggle for its control; China and the present revolution; the Philippines and Hawaii; and the International politics of the Far East and of the Pacific Ocean. *One hour. One Semester.*

7. British Colonies and Dependencies. This course includes a survey of the important political, economic and social conditions in the leading British possessions, especially in Canada, Australia, New Zealand, India and Egypt; and a discussion of British colonial policy and problems. *One hour. One Semester.*

8. The Near East and Africa. This includes a discussion of the Balkan situation; the history, the achievements, and the problems of the Turkish Revolution; the extent and the significance of the political awakening and the religious revival throughout the Mohammedan world; the history of the partitioning of Africa among the European powers; the character of European government in Africa, especially that of the Congo Free State; the results of the Boer war in British South Africa; the nationalist movement in Egypt and the successes and failures of the British administration; the achievements of the native races; and a study of the results and the methods of mission work. *One hour.*

9. Historical Seminar. The students in the Department of History meet once a week in a seminar for the consideration of particular topics of present interest. Each member is expected to present reports during the year, which then form the basis for a critical discussion. Some of the subjects presented in the past have treated of conditions in India, Tibet, the Congo Free State, Manchuria, Turkey, Russia in Asia, China, Japan, Korea, the Philippines and Egypt.

During the present year, 1911–12, courses 1, 3, 6, 7 and 9 are given.

The most distinctive feature of the work in this Department is the insistence that its students shall obtain a general knowledge of the history of the world as a whole, not merely of the United States and of three or four of the states of Europe. The laws of historical development can be fully understood only after a study of all important peoples, including those in Asia and Africa. Emphasis is placed upon existing conditions in the several countries, both because these are most vital and because they furnish the richest material for a comparative study of the different stages in the world's political, economic, social and religious advance.

In carrying out these features of its work, the Department has assisted the President of the University in arranging annual conferences for the discussion of the history and the present-day conditions in various lands. In 1909 the sessions dealt with the Far East, including China, Korea, India, the Philippines and Hawaii; in 1910 with the Near East and Africa; and in 1911 with Japan and Japanese-American relations. Altogether more than one hundred men have taken part in these conferences,—University professors, anthropologists, leading natives, government officials, travellers and missionaries—all of whom could speak with authority. Their addresses and papers are published by the University in the Journal of Race Development.

LIBRARY

The Library is under the control of a Library Committee, appointed by the Trustees, of which the President of the University is *ex officio* chairman. The duties of this committee are to advise concerning the arrangement, cataloguing, use of books, and other matters pertaining to the Library not reserved to the Trustees nor otherwise provided for.

LIBRARY COMMITTEE

PRESIDENT G. STANLEY HALL, *Chairman*
PRESIDENT EDMUND C. SANFORD
PROFESSOR WILLIAM E. STORY, *Secretary*

LIBRARY STAFF

LOUIS N. WILSON, *Librarian*

ASSISTANTS

EDITH M. BAKER, *Senior Assistant*
HELEN J. ELLIOT, *Cataloguer*
MARY D. THURSTON, *College Library*

MARGARET ARMSBY
THEODATE L. SMITH
HELEN THAYER
KATHERINE E. WYATT

The Library building is situated on the corner of Main and Downing streets. The Public Opening of the new building was held January 14th, 1904. A full description of the building and of the Proceedings at the Opening will be found in the *Publications of the Clark University Library* for April, 1904 (Vol. 1, No. 3).

The College Library and study rooms occupy the lower floor of the new building, opened in September, 1910, and described in the College Record, July, 1910, Vol. 5, pp. 185-187.

The Library contains about 55,000 bound volumes and pamphlets, and the reading-room receives over 400 journals.

The books are grouped as follows:

A	Works of General Reference	L	Biography
B	Journals	M	Anthropology
C	Mathematics	N	Education
CD	Math.-Physics	O	General Science
D	Physics	P	History
DE	Physical Chemistry	Q	Law
E	Chemistry	R	Political and Social Science
F	Biology, Zoölogy, Botany, Physiology, Neurology	S	English
		T	Modern Languages
G	Geography	U	Classics
H	Pathology	W	Practical Arts
I	Psychology	X	Library Science
J	Philosophy	Y	Art
K	Religious Psychology	Z	Manuscripts

Tuesday and Friday mornings, each week, all books recently added to the library are placed upon a table in the Reference section where they remain for three days. This affords the members of the University and College an opportunity to examine the new books in all departments before they are placed upon the shelves for circulation.

About once a month, during term, by the courtesy of our booksellers, new books are placed for inspection on one of the tables in the Reference section. Any member of the University or College may recommend the purchase for the library of books thus displayed, and such recommendation will receive prompt attention.

All books are classified by the heads of departments and particular attention is paid to the needs of students engaged in research work. The library already possesses a good collection of complete sets of the best scientific periodicals. It makes liberal purchases for individual needs and supplements these by drawing upon the resources of the older and larger libraries through the inter-library loan system. During the past year 713 volumes were borrowed from, and 286 volumes lent to, other libraries. The number of books added each year is about four thousand volumes.

The publications of the Library, edited by the Librarian, and begun in October, 1903, are as follows:

VOL. I.

No. 1. WILSON, LOUIS N.
Bibliography of the Published Writings of President G. Stanley Hall. Oct. 1903

No. 2. WILSON, LOUIS N.
Bibliography of Child Study for the Year 1902. Jan. 1904

No. 3. Proceedings and Addresses at the Public Opening of the Library Building of Clark University, Thursday, January 14, 1904 Apr. 1904

No. 4. WILSON. LOUIS N.
Bibliography of Child Study for the Year 1903. July 1904

No. 5. WILSON, LOUIS N.
Preparing Manuscript for the Press. Jan. 1905

No. 6. Founder's Day, Clark University. Apr. 1905

No. 7. WILSON, LOUIS N.
Bibliography of Child Study for the Year 1904. July 1905

No. 8. DE PEROTT, JOSEPH
The Probable Source of the Plot of Shakespeare's Tempest. Oct. 1905

No. 9. Proceedings and Addresses at the Public Opening of the Art Department of Clark University. Dec. 1905

VOL. 2.

No. 1. List of Books and Pictures in the Clark Memorial Collection. July 1906

No. 2. WILSON, LOUIS N.
Bibliography of Child Study for the Year 1905. Oct. 1906

No. 3. WILSON, LOUIS N.
A few Titles in Child Study. Apr. 1907

No. 4. Proceedings at the First Annual Banquet of the New England Association of Alumni of Clark University, and at the Banquet of the Washington, D. C., Alumni Association, 1907. June 1907

No. 5. WILSON, LOUIS N.
Bibliography of Child Study for the Year 1906. Aug. 1907

No. 6. WILSON, LOUIS N.
Bibliography of Child Study for the Year 1907.
Sept. 1908

No. 7. MACLAURIN, RICHARD C.
The Outlook for Research (Founder's Day Address, Feb. 1, 1911). Mch. 1911

No. 8. WILSON, LOUIS N.
List of Papers in the Field of Religious Psychology Presented at Clark University. July 1911

No. 9. WILSON, LOUIS N.
List of Degrees Granted at Clark University and Clark College.
Oct. 1911

VOL. 3.

No. 1. ROETHLEIN, BARBARA ELIZABETH
The Relative Legibility of Different Faces of Printing Types.
Jan. 1912

No. 2. WILSON, LOUIS N.
Suggestions for a Model Private Library at Clark College.
Feb. 1912

The department of religious psychology, established within the past few years has grown rapidly and supports The *Journal of Religious Psychology*. The Journal is edited by President Hall and Professor Chamberlain and is now in its fifth volume.

The books in the Art Department are accessible on application to the librarian, but, by the terms of the Founder's will, they cannot be taken from the building.

All the privileges of the library are open to all members of the University, and each member has direct access to every book and journal.

The library is open from 8 a.m. to 6 p.m. each week day from Sept. 1 to July 1. During July and August it is open from 8 a.m. to 5 p.m. from Mondays to Fridays, and on Saturdays from 8 a.m. to 12 m. The library is closed July 4th, Thanksgiving Day and Christmas Day.

Outside the University are found:

The Library of the American Antiquarian Society, organized in 1812, and containing over 120,000 volumes, accessible to all members of the University.

The Worcester Public Library, containing 600 newspapers and magazines and 175,000 volumes, has, in the past, to some extent supplemented the scientific publications purchased by the University, and all its privileges are accessible without charge.

The Library of the Worcester District Medical Society of about 10,000 volumes, is also free to all members of the University.

LIBRARY RULES

No loud talking is allowed in any part of the Library.

Every book shall be returned at the end of one calendar month from the time at which it was taken out, but may be called in at any time at the discretion of the Librarian.

Current numbers of periodicals shall not be taken out until they have been in the Library ten days.

All dictionaries, cyclopædias, and books of general reference are permanently reserved.

Reserved books and current numbers of periodicals, exempt from circulation, may be taken out after 5.30 p.m., but must be returned before 9 o'clock the next morning, excepting that such books and periodicals may be taken out Saturdays at 12 o'clock m., and may be kept until 9 o'clock the next Monday morning.

Readers must not write nor make any mark upon any book, manuscript, map, or other property belonging to the Library.

Any breach of the above Rules will involve suspension of the Library privileges until personally restored by the Librarian. All such cases shall be laid before the Library Committee at their next meeting.

ART DEPARTMENT

In his last will and testament the Founder of the University bequeathed

"the sum of $100,000, as an endowment fund for the Art Department of said University, and said sum is to be held and kept sacred and intact as a principal not to be used or expended under any conditions; but the income, interest or proceeds thereof shall be used only in putting and keeping said works of art or others given or obtained for said department in good condition and in taking care of them; and then if there is a surplus of the income of said fund left, I will and direct that it be used in the purchase of additional works of art or of such matters as will add to the usefulness and efficiency of said Art Department."

Under these conditions a large room has been furnished and equipped on the upper floor of the Library Building. Upon the death of Mrs. Clark, those of the Founder's collections that were deemed most suitable for this purpose were arranged and displayed in this room, together with his most valuable books, which, by the conditions of the will, cannot be removed from the building. A complete catalogue of these books and paintings has been published in the PUBLICATIONS OF THE LIBRARY, Vol. 2, No. 1.

A Curator and Custodian have been appointed by the Board (see page 118) and all the collections are now accessible to visitors. The Art Department is open daily (except Sundays) from 9 a.m. to 5 p.m.

In 1909 there was added to the collection a large oil portrait of the late Carroll D. Wright, President of the Collegiate Department from 1902 to 1909. The painting is by the late Frederick P. Vinton of Boston and received the Temple Gold Medal at the 1909 Exhibition of the Pennsylvania Academy of the Fine Arts. In the spring of 1911 a similar portrait of President G. Stanley Hall of the University, also painted by Mr. Vinton, was added, to the collection.

Scale models of the two new buildings and the University grounds have been made by T. J. McAuliffe and Son of Worcester, under the direction of the architects, Messrs. Frost, Briggs and Chamberlain.

REGULATIONS

1. All requisitions for apparatus must be made through the Bursar's office upon printed blanks provided for that purpose and signed by a member of the staff.

2. So far as possible, orders for only the kind and amount of apparatus certain to be used during the year shall be placed; nothing shall be ordered for future years, and apparatus for research shall take precedence over that for teaching and illustration only.

3. Requisitions for repairs, furniture, plumbing and work about the buildings must be made through the Bursar's office in writing and with detail, and, when once passed upon, no change involving additional expense can be made in the requisition without the consent of the Finance Committee.

4. No unappropriated rooms and no part of the University grounds shall be used for any purpose, and appropriated rooms shall not be used for other purposes than the stated University work for which they were intended, without previous permission from the office.

5. Unless for special reasons, absence of instructors from their stated exercises or from town for two consecutive week days in term time should be announced at the office, and for longer absence permission should be obtained beforehand.

6. The Trustees desire that no Instructor, Docent, or

Fellow shall enter upon other engagements outside his proper work in the University of a kind or amount likely to lessen his full efficiency for science within the University.

7. Appropriations shall hereafter cover all apparatus and supplies of whatever nature for laboratories, for demonstration or illustration; all metal and carpenter work connected with the scientific activity of each department; and every form of special service. Appropriations, however, shall not hereafter cover orders for books or journals, which shall be submitted to the Library Committee.

8. The several appropriations made to individual instructors and others shall be the full and fixed limit of the liability of the University, to be on no account transcended; and for every excess over the appropriations, from whatever cause, the instructor making the order shall be personally responsible.

9. No order for any purpose shall be paid by the University, whether on appropriations or for general supplies, that has not passed through the Bursar's office.

10. The President, Professors, Assistant Professors and regular Instructors authorized by the Board to do graduate work, together with the Librarian, shall constitute the Faculty of the University. Its meetings shall be called and presided over by its President, or, in his absence, by a Professor whom he shall designate. The Faculty shall elect a Secretary and its records shall always be accessible to the Trustees. Its jurisdiction shall include all matters pertaining to the instruction, conduct and discipline of students, and such other duties as may be prescribed by the Trustees.

11. The President of the University shall make, at the October meeting, an annual report on the condition of the departments and their work during the year and shall have authority to require and receive from all Instructors and Officers of the University and Library such reports as he may deem necessary. A copy of these reports, including that of the Library, shall be deposited with the Mayor of the City.

12. The University Faculty shall have the oversight of all graduate work and shall recommend for the Master's, Doctor's and all other graduate degrees upon such terms, conditions, and forms as it may determine, and exercise such other functions and responsibilities as are not expressly assigned to the Trustees or to the Collegiate Department.

13. The Custodian of the Art Collection shall have general oversight over its room in the Library Building and its contents, together with their care and use, under the direction and control of the Curator. The Curator shall from time to time submit to the Trustees his recommendations for the purchase of additional works of art from the income of the Art Fund, based on and together with the opinions of experts as to their value and desirability. All such purchases shall be approved by the Board of Trustees, or by such a committee of their members as they shall appoint for that purpose.

14. The President of the University shall make an annual report to the Trustees of the action of the Library Committee, of which he is Chairman, and this report, if approved, shall be filed and preserved.

DEGREES CONFERRED

On June 16, 1910, the University conferred degrees upon the following persons:

MASTER OF ARTS

Edwin Leavitt Clarke
Thesis: Evidences of a new social philosophy.

Alice Harper Damon
Thesis: Biological interests of girls.

Benjamin George Dubois
Thesis: Migration of students.

Robert Thomas Elliott
Thesis: The development of the American colonial policy.

Paul Sumner Emerson
Thesis: British South Africa: its history and present condition.

Erwin Oliver Finkenbinder
Thesis: An experimental study on the inter-relations of the four gustatory qualities.

Pierce James Fleming
Thesis: Moving pictures as an educational factor.

Harold Francis Fuller
Thesis: The duration of impact between elastic spheres.

Ernest Hammond
Thesis: The juvenile court.

Alice Berg Hayes
Thesis: Reduction of power determinants.

Irving Arlington Hinkley
Thesis: The relative development of certain selected industries in the United States and in New England.

Frank Eugene Howard
Thesis: Sources of pragmatism.

George William Mackay

Thesis: The psychology of oratory.

Frederick Thomas Mayer-Oakes

Thesis: Infantile physical characters in adults: a study in human somatology.

Arthur Monroe

Thesis: Korea and the Japanese: a study of events and conditions.

Curtis Hugh Morrow

Thesis: British administration in Egypt: its failures and successes.

Henry Brown Moyle

Thesis: Moral imbecility.

William Bryant Perry

Thesis: The negro in business.

Wallace Frank Powers

Thesis: A study of measurements of self-induction.

Barbara Elisabeth Roethlein

Thesis: The legibility of different faces of type.

George Gordon Sampson

Thesis: Forms and powers of Massachusetts state boards and commissions.

George Herbert Shafer

Thesis: Health inspection of schools in the United States.

Robert Luther Sibley

Thesis: A solution of the problem as to whether the inversion of cane-sugar by acids is a mono-molecular reaction with respect to sugar.

Claude Leander Smith

Thesis: The constructive and destructive factors in the christianization of China

Collye Fredward Sparkman

Thesis: Satan and his ancestors from a psychological standpoint.

Adele Adams Steele

Thesis: Some effects of invention and discovery on education.

Asa George Steele

Thesis: Some phases of the problem of industrial education.

Harold Frederic Stimson

Thesis: A study of vowels by the oscillograph.

Thomas Francis Sullivan

Thesis: Industrial education in Massachusetts.

Ralph Hatheway White

Thesis: A rapid method for the determination of the partial pressures of binary mixtures.

Ida Kirtley Wood

Thesis: An introduction to the modern history of the education of women.

Moses Edwin Wood

Thesis: The history of school superintendence in the United States.

Sohichi Yamada

Thesis: Suggestion in education.

DOCTOR OF PHILOSOPHY

Charles Walter Bacon

Dissertation: A study of fractional distillation.

Guy Gaillaird Becknell

Dissertation: On demagnetization of iron and steel bars by strain and impact.

Thomas Charles Carrigan

Dissertation: The law and the American child.

Floyd Earle Chidester

Dissertation: Cyclopia in mammals.

Edmund Smith Conklin

Dissertation: Pedagogy of college ethics.

Herbert Carroll Cooley

Dissertation: The religious education of children.

Robert Hutchings Goddard

Dissertation: Current rectification at contacts of dissimilar solids.

Louis Dunton Hartson

Dissertation: The psychology of the club; a study in social psychology.

McLeod Harvey

Dissertation: The pedagogy of missions.

Solomon Lefschetz

Dissertation: On the existence of loci with given singularities.

William Alderman Matheny

Dissertation: Biology of sclerotinia fructigena and sclerotinia cinerea.

William John Montgomery

Dissertation: Singularities of twisted quintic curves.

Leonard Blaine Nice

Dissertation: The comparative effects of alcohol, nicotine and caffeine on the growth and reproduction of white mice.

Simeon Spidle

Dissertation: The belief in immortality.

Harry Porter Weld

Dissertation: An introspective study of the appreciation of music.

Clarence Delette Wright

Dissertation: A new study of steric hindrance in esterification.

The following gentlemen also have taken the examination for the doctor's degree, but have not yet completed all the formal requirements:

Eugene W. Bohannon

A. Caswell Ellis

PUBLICATIONS

A Register and Official Announcement is issued each year in February or March.

In the years 1890, 1891, 1893, and 1902, the annual Report of the President to the Board of Trustees was printed.

A Summer School was held for nine years ending in 1903, and in such years a Summer School Programme was issued.

In July, 1899, the University observed its tenth anniversary, and published the following volume:

Clark University, 1889-1899. Decennial Celebration. 8 x 11 in., pp. 566. Published for the University. Price, $5.00. Contains the lectures delivered by Professors Picard, Boltzmann, Ramon y Cajal, Mosso and Forel at the Decennial Celebration, July, 1899; also reports by the heads of departments on their aims and ideals, with a list of past and present members of the University and the titles of their published papers.

Proceedings of the Child Conference for Research and Welfare. Conferences held at Clark University in the summers of 1909 and 1910. Vol. 1, 1909, 257 p., contains 48 papers on problems relating to child welfare. Vol. 2, 1910, 287 p., contains 34 papers, on similar subjects. The

papers in Vol. 1 were reprinted from the Pedagogical Seminary for September and December 1909, but those in Vol. 2, with one exception, have not been printed elsewhere. Price $2.00 per volume in paper, $2.50 in cloth. Louis N. Wilson, Publisher, Worcester, Mass.

In connection with the celebration of the 20th anniversary of Clark University in September, 1909, conferences and lectures were held in the departments of Psychology and Education to which distinguished scientists and educators in this and other countries contributed. Lectures were given in Pedagogy and Psychiatry by Prof. Sigmund Freud of the University of Vienna and Dr. Carl C. Jung of the University of Zürich; in Psychology by Prof. William Stern of the University of Breslau, by Prof. E. B. Titchener of Cornell University, Prof. Franz Boas of Columbia University, Prof. H. S. Jennings of Johns Hopkins University, and Dr. Adolf Meyer of the Johns Hopkins Medical School; and in School Hygiene by Prof. Leo Burgerstein of the University of Vienna. The conferences in Psychology were presided over by Prof. Guy Montrose Whipple of Cornell University and Prof. Carl E. Seashore of the University of Iowa; and those in Education by Dr. Elmer Ellsworth Brown, U. S. Commissioner of Education, Prof. F. B. Dresslar of the University of Alabama, and Dr. Thomas A. Storey of the College of the City of New York. The lectures in Psychology, Education and School Hygiene and the papers presented at the Educational Conferences have been published in a volume entitled *Lectures and Addresses Delivered Before the Departments of Psychology and Pedagogy in Celebration of the 20th Anniversary of the Opening of Clark University.* Worcester, 1910.

Chemical Addresses: A collection of papers presented at the chemical conferences of the Second Decennial Celebration of Clark University. The collection has been published

jointly by Clark University and the American Chemical Society. In organizing the conferences an effort was made to have all the more important branches of chemical research represented by competent lecturers. The collection includes:

1. Professor Marston Taylor Bogert, of Columbia University: *A Review of Some Recent Investigations in the Quinazoline Group.*

2. Professor John E. Bucher, of Brown University: *The Acids of the Phenyl-Propiolic Series and Their Condensation to Naphthalene Derivatives.*

3. Dr. André Debierne, of the University of Paris, France: *Review of Recent Progress in Radioactive Chemistry.*

4. Dr. C. S. Hudson, of the United States Department of Agriculture: *A Review of Discoveries on the Mutarotation of the Sugars.*

5. Dr. P. A. Levene, of the Rockefeller Institute of Medical Research: *Review of Recent Progress in Bio-Chemistry.*

6. Professor Arthur Michael, sometime Director of the Department of Chemistry in Clark University: *A Theory of Organic Chemistry Founded on the Law of Entropy.*

7. Professor S. P. Mulliken, of the Massachusetts Institute of Technology (formerly of Clark University): *Progress in Systematic Qualitative Organic Analysis.*

8. Professor William A. Noyes, of the University of Illinois: *Molecular Rearrangements of Carbon Compounds.*

9. Professor Theodore William Richards, of Harvard University: *Review of Recent Advances in Thermochemistry.*

10. Mr. Michael D. Sohon, of the Morris High School, New York: *Secondary School Chemistry: Method of Teaching It and Content of the Course.*

11. Professor Julius Stieglitz, of the University of Chicago (formerly of Clark University): *Catalysis, on the Basis of Work with Amido-Esters.*

12. Professor H. P. Talbot, of the Massachusetts Institute of Technology: *Correlation of the Chemical Courses in Secondary Schools and Colleges.*

13. Professor Edward W. Washburn, of the University of Illinois: *The Fundamental Law for a General Theory of Solutions.*

14. Dr. Willis R. Whitney, President of the American Chemical Society, Director of the Research Laboratories of the General Electric Company: *Organization of Industrial Research.*

15. Mr. Jesse E. Whitsit, of the De Witt Clinton High School, New York: *Secondary School Chemistry: Content of the Course.*

The above papers have already been gradually published, partly in *Science*, but mostly in the *Journal of the American Chemical Society*. Further papers, presented at the Clark Celebration by Professor Wilder D. Bancroft, of Cornell University, Professor Gilbert Newton Lewis, of the Massachusetts Institute of Technology, and Professor James F. Norris, of Simmons College, could not be prepared for publication.

China and The Far East, pp. xxii, 455, New York: T. Y. Crowell and Company, 1910, $2.00 net. This volume, edited by George H. Blakeslee, contains, in addition to the historical introduction by the editor, twenty-two of the addresses delivered during the Conference upon China and the Far East, which was held at Clark University, October, 1909, as one part of the Twentieth Anniversary Celebration of that year.

JOURNALS CONNECTED UNOFFICIALLY WITH THE DEPARTMENTS

The American Journal of Psychology. This journal was commenced in November, 1887, and is now edited by G. Stanley Hall, E. C. Sanford, E. B. Titchener (Cornell University), and J. W. Baird, with the assistance of an international board of co-operators. Each volume contains four numbers—issued in January, April, July and October. Besides original articles, a considerable portion of its space is devoted to careful digests of the important literature in its field. Price $5 per volume; single numbers, $1.50. Florence Chandler, Publisher, Worcester, Mass.

The Pedagogical Seminary. This journal was begun in January, 1891, and is edited by the President of the University with the assistance of William H. Burnham, Professor of Pedagogy. It is an international record of educational literature, institutions and progress, and is devoted solely to the highest interest of education in all grades, with digests of important literature of all countries. It is the organ of the Educational Department of the University. Each volume contains four numbers—issued in March, June, September and December. Price $5 per volume; single numbers, $1.50. Florence Chandler, Publisher, Worcester, Mass.

Journal of Religious Psychology (including its authropological and sociological aspects). This journal was begun in May, 1904, and is now in its fifth volume. It is edited by President G. Stanley Hall and Professor Alexander F. Chamberlain. The aim of this journal is to publish original material from all parts of the field of religious psychology. Special attention is devoted to the literature of the subject, both books, monographs and articles in current periodicals. It is published quarterly, each volume (containing about 500 pages) beginning with the January issue. Price $3.00 per volume; single copies $1.00. Louis N. Wilson, Publisher, Worcester, Mass.

The Journal of Race Development. This journal was begun in July, 1910 and is edited by Dr. Blakeslee and President Hall with the coöperation of a board of sixteen contributing editors. It offers itself as a forum for the discussion of the problems which relate to the

progress of races and states generally considered backward in their standard of civilization. Issued quarterly, each number containing about 125 pages. Price $2.00 per volume; 50 cts. per number. Louis N. Wilson, Publisher, Worcester, Mass.

The Waverly Press
WILLIAMS & WILKINS COMP.
BALTIMORE, U. S. A.

Clark University
in the City of Worcester
Massachusetts

Register and Twenty-fifth Official Announcement

1913

CLARK UNIVERSITY

WORCESTER, MASSACHUSETTS

REGISTER AND TWENTY-FIFTH OFFICIAL ANNOUNCEMENT

WORCESTER, MASSACHUSETTS
Published for the University
February, 1913

BOARD OF TRUSTEES

A. George Bullock
Orlando W. Norcross
Francis H. Dewey
Arthur F. Estabrook
Herbert Parker
Lucius Tuttle
Austin S. Garver
Arthur P. Rugg

OFFICERS

President . . .	A. George Bullock
Vice-President and Treasurer	Francis H. Dewey
Secretary . . .	G. Stanley Hall

COMMITTEES

Finance

A. George Bullock — Francis H. Dewey
Arthur F. Estabrook

Buildings

Orlando W. Norcross

CALENDAR 1913–1914

1913		
FEB. 1	Saturday	Founder's Day*
FEB. 22	Saturday	Washington's Birthday
APRIL 7	Monday	Spring Recess
APRIL 12	Saturday	
APRIL 19	Saturday	Patriots' Day
MAY 30	Friday	Memorial Day
JUNE 17	Tuesday	Twenty-fourth academic year closes

Summer Vacation of 14 Weeks

SEPT. 25	Thursday	Twenty-fifth academic year begins
OCT. 13	Monday	Columbus Day
NOV. 27	Thursday	Thanksgiving Day
DEC. 24	Wednesday	Christmas Recess
1914		
JAN. 3	Saturday	
FEB. 2	Monday	Founder's Day*
FEB. 23	Monday	Washington's Birthday
APRIL 6	Monday	Spring Recess
APRIL 11	Saturday	
APRIL 20	Monday	Patriots' Day
MAY 30	Saturday	Memorial Day
JUNE 16	Tuesday	Twenty-fifth academic year closes

*Not a holiday

MEMBERS

STAFF

GRANVILLE STANLEY HALL, PH.D., LL.D. 156 Woodland St.
President of the University and Professor of Psychology

A.B., Williams College, 1867; A.M., 1870; Ph.D., Harvard University, 1878; Lecturer in Harvard and Williams Colleges, 1880–81; Professor of Psychology, Johns Hopkins University, 1881–88; President and Professor of Psychology, Clark University, 1888–; LL.D., University of Michigan, 1888, Williams College, 1889, and Johns Hopkins University, 1902; Chairman of the Library Committee and Curator of the Art Collection, Clark University. Resident Member of the Massachusetts Historical Society.

WILLIAM EDWARD STORY, PH.D. 17 Hammond St.
Professor of Mathematics and Secretary of the Faculty

A.B., Harvard University, 1871; Ph.D., University of Leipzig, 1875; Parker Fellow (Harvard), 1874–75; Tutor of Mathematics, Harvard University, 1875–76; Associate, Assistant Professor, and Associate Professor of Mathematics, Johns Hopkins University, 1876–89; Professor of Mathematics, Clark University, 1889–; Professor of Mathematics, Clark College, 1902–07. Member of the National Academy of Sciences; Member of the London Mathematical Society; Resident Fellow of the American Academy of Arts and Sciences.

EDMUND CLARK SANFORD, PH.D., SC.D., LL.D.
Lecturer on College Administration 160 Woodland St.

A.B., University of California, 1883; Fellow, Johns Hopkins University, 1887; Ph.D., Johns Hopkins University, 1888; Instructor in Psychology, Johns Hopkins University, 1888; Instructor in Psychology, Clark University, 1889-92; Assistant Professor, 1892–1900; Professor of Psychology, Clark College, 1903–07; Professor of Experimental and Comparative Psychology, Clark University, 1900–09; Lecturer, 1909–; Sc.D., Hobart College, 1909; President of Clark College, 1909–; LL.D., University of California, 1912.

ARTHUR GORDON WEBSTER, PH.D., SC.D., LL.D.
Professor of Physics 66 West St.

A.B., Harvard University, 1885; Instructor in Mathematics, Harvard University, 1885–86; Parker Fellow, 1886–89; Student, Universities of Berlin, Paris, Stockholm, 1886–90; Ph.D., University of Berlin, 1890; Docent in Physics, Clark University, 1890–92; Assistant Professor, 1892–1900; Professor, 1900–; Professor of Physics, Clark

College, 1902–07; Director of Physical Laboratories; Sc.D., Tufts College, 1905; LL.D., Hobart College, 1908. Member of the National Academy of Sciences; Resident Fellow of the American Academy of Arts and Sciences; Member of the American Philosophical Society.

HENRY TABER, PH.D.

Professor of Mathematics — 65 West St.

Ph.B., Yale University, 1882; Ph.D., Johns Hopkins University, 1888; Assistant in Mathematics, Johns Hopkins University, 1888–89; Docent in Mathematics, Clark University, 1889–92; Assistant Professor, 1892–1903; Professor, 1903–; Member of the London Mathematical Society; Resident Fellow of the American Academy of Arts and Sciences.

CLIFTON FREMONT HODGE, PH.D.

Professor of Biology — 103 May St.

A.B., Ripon College, 1882; Fellow in Biology, Johns Hopkins University, 1888–89; Ph.D., Johns Hopkins University, 1889; Fellow in Psychology and Assistant in Neurology, Clark University, 1889–91; Instructor in Biology, University of Wisconsin, 1891–92; Assistant Professor of Physiology and Neurology, Clark University, 1891–1906; Professor of Biology, 1906–; Professor of Biology, Clark College, 1902–.

WILLIAM HENRY BURNHAM, PH.D.

Professor of Pedagogy and School Hygiene — 17 Circuit Ave.

A.B., Harvard University, 1882; Instructor in Wittenberg College, 1882–83; Instructor, State Normal School, Potsdam, N. Y., 1883–85; Fellow, Johns Hopkins University, 1885–86; Ph.D., 1888; Instructor in Psychology, 1888–89; Docent in Pedagogy, Clark University, 1890–92; Instructor, 1892–1900; Assistant Professor, 1900–06; Professor, 1906–.

ALEXANDER FRANCIS CHAMBERLAIN, PH.D.

Professor of Anthropology — 19 Baker St.

B.A., University of Toronto, 1886; M.A., 1889; Fellow in Modern Languages, University College, Toronto, 1887–90; Librarian, Canadian Institute, Toronto, 1889–90; Fellow in Anthropology, Clark University, 1890–92; Ph.D., Clark University, 1892; Lecturer in Anthropology, Clark University, 1892–1900; Acting Assistant Professor, 1900–04; Assistant Professor, 1904–11; Professor, 1911–; Editor, *Journal of American Folk-Lore*, 1900–1907; Co-editor, *Journal of Religious Psychology*, 1911–; Corresponding Member O Instituto de Coimbra, Portugal; Member of the American Antiquarian Society; Honorary Member American Folk-Lore Society; Fellow American Ethnological Society; Contributor to *Encyclopedia Britannica* (11th Ed.).

MARTIN ANDRE ROSANOFF, SC.D.

Professor of Chemistry — 7 Downing St.

Ph.B., New York University, 1895; Sc.D., 1908; Student, University of Berlin, 1895–96; University of Paris, 1896–98; Research Fellow, New York University, 1899–1900; Instructor in Theoretical Chemistry, New York University, 1904–05; Assist-

ant Professor of Chemistry, 1905–07; Assistant Professor of Chemistry, Clark University, 1907–11; Professor, 1911–; Assistant Professor of Organic Chemistry, Clark College, 1907–10; Professor, 1910–12; Director of University Chemical Laboratory; Fellow of the American Association for the Advancement of Science; Member of the Royal Society of Arts; Nichols Medalist of the American Chemical Society.

GEORGE HUBBARD BLAKESLEE, PH.D.
Professor of History — 24 Richards St.

A.B., Wesleyan University, 1893; A.M., Harvard University, 1899; Ph.D., 1903; Student, Johns Hopkins University, 1893–94; Parker Fellow, Harvard, 1901–02; Student, Universities of Berlin, Leipzig, and Oxford, 1901–03; Instructor in History, Clark College, 1903–04; Assistant Professor, 1904–09; Professor, 1909–; Instructor in History, Clark University, 1905–11; Professor, 1911–.

JOHN WALLACE BAIRD, PH.D. — 17 Circuit Ave.
Professor of Experimental Psychology

A.B., University of Toronto, 1897; Student, University of Leipzig, 1898–99; Fellow, University of Wisconsin, 1899–1901; Fellow, Cornell University, 1901–02; Ph.D., 1902; Assistant in Psychology, 1902–03; Carnegie Research Assistant, 1903–04; Instructor in Psychology, Johns Hopkins University, 1904–06; Instructor in Psychology, University of Illinois, 1906–07; Assistant Professor, 1907–February, 1910; Assistant Professor of Experimental Psychology, Clark University, February, 1910–February, 1913; Professor, February, 1913–.

JOSEPH DE PEROTT
Lecturer in Mathematics — 5 Hawthorn St.

Student, Universities of Paris and Berlin, 1877–80; Docent in Mathematics, Clark University, 1890–1904; Lecturer, 1904–.

LOUIS N. WILSON, LITT.D. — 11 Shirley St.
Librarian of the University and Custodian of the Art Collection

Litt.D., Tufts College, 1905.

FRANK HAMILTON HANKINS, PH.D.
Instructor in Economics and Sociology — 4 Cabot St.

A.B., Baker University, 1901; Student, Columbia University, 1903–04; Scholar in Sociology, 1904–05; Fellow in Statistics, 1905–06; Student, 1907–08; Ph.D., Columbia University, 1908; Instructor in Economics, Clark College, 1906–07; Assistant Professor, 1908–; Instructor in Economics and Sociology, Clark University, 1906–07; 1908–.

JOHN CHARLES HUBBARD, PH.D.
Instructor in Physics — 8 Loudon St.

B. S., University of Colorado, 1901; Scholar in Physics, Clark University, and Assistant to Professor Webster, 1901–02; Fellow, 1902–04; Ph. D., Clark University, 1904; Instructor in Physics, Simmons College, 1904-05; Asssistant Professor of

Physics, New York University, 1905–06; Assistant Professor of Physics, Clark College, 1906–11; Professor, 1911–; Honorary Fellow in Physics, Clark University, 1907–09; Instructor, 1910–.

FRANK BLAIR WILLIAMS, PH.D.
Instructor in Mathematics — 2 Isabella St.

C.E., University of Missouri, 1890; M. S., 1893; Engineering Work with the Mississippi River Commission, 1890–92; Teaching Fellow in Mathematics, University of Missouri, 1892–93; Survey Work with the Mississipi River Commission, 1894–95; United States Assistant Engineer in Tennessee River Improvement, 1895–97; Scholar in Mathematics, Clark University, 1897–98; Fellow, 1898–1900; Ph.D., 1900; Assistant Professor of Civil Engineering, Union College, 1900–05; Assistant Professor of Engineering and Mathematics, 1905–06; Professor of Engineering Mathematics, 1906–07; Assistant Professor of Mathematics, Clark College, 1907–08; Professor, 1908–; Honorary Fellow in Mathematics, Clark University, 1909–10; Instructor, 1910–.

ANNUAL APPOINTMENTS

EDWARD COWLES, M.D., LL.D., Boston
Non-Resident Lecturer in Psychiatry

A.B., Dartmouth College, 1859; A.M., 1863; Medical House Pupil, Retreat for the Insane, Hartford, Conn., 1860–62; M.D., Dartmouth Medical School, 1863; M.D., College of Physicians and Surgeons, New York, 1863; Medical Corps, United States Army, 1863–72; Resident Physician and Superintendent, Boston City Hospital, 1872–79; Medical Superintendent, McLean Hospital, Waverley, Mass., 1879–1903; Lecturer on Mental Diseases, Dartmouth Medical School, 1885–86; Professor of Mental Diseases, 1886–; Fellow by Courtesy, Johns Hopkins University, 1887–88; Clinical Instructor in Mental Diseases, Harvard Medical School, 1888–; LL.D., Dartmouth College, 1890; Non-Resident Lecturer in Psychiatry, Clark University, 1903–.

ARTHUR AMOS NOYES, PH.D., SC.D., LL.D., Boston
Non-Resident Lecturer in Chemical Research

S.B., Massachusetts Institute of Technology, 1886; S.M., 1887; Ph.D., University of Leipzig, 1890; Assistant and Instructor in Chemistry, Massachusetts Institute of Technology, 1887–88 and 1890–94; Assistant Professor, 1894–99; Professor and Director of the Research Laboratory of Physical Chemistry, 1899–; Non-Resident Lecturer in Chemical Research, Clark University, 1910–. Member of the National Academy of Sciences.

ROBERT KENNEDY DUNCAN, A.B., Pittsburgh, Pennsylvania
Non-Resident Lecturer in Industrial Chemical Research

A.B., University of Toronto, 1892; Fellow in Chemistry, Clark University, 1892–93; Graduate Student, Columbia University, 1897–98; Professor of Chemistry, Washington and Jefferson College, 1901–06; Professor of Industrial Chemistry,

University of Kansas, 1906–; Director of Industrial Research, 1910–; Professor of Industrial Chemistry and Director of Industrial Research, University of Pittsburgh, 1910–; Non-Resident Lecturer in Industrial Chemical Research, Clark University, 1911–.

SAMUEL PAUL CAPEN, PH.D.

Lecturer on School Administration — 9 Downing St.

A.B., A.M., Tufts College, 1898; A.M., Harvard University, 1900; Ph.D., University of Pennsylvania, 1902; Harrison Fellow in Germanic Languages, University of Pennsylvania, 1900–01; Graduate Student, on leave of absence, 1901–02; Student, University of Leipzig, 1901–02; Instructor in Modern Languages, Clark College, 1902–03; Assistant Professor, 1903–08; Professor, 1908–; Lecturer on School Administration, Clark University, 1911–.

SAMUEL WEILLER FERNBERGER, PH.D.

Instructor in Experimental Psychology — 65 Charlotte St.

B. S., University of Pennsylvania, 1908; M.A., 1909; Ph.D., 1912; Assistant in Psychology, University of Pennsylvania, 1908–09; Instructor, 1910–12.

SAMUEL TORREY ORTON, M.D.

Lecturer in Neurology — Worcester State Hospital

B.S., Ohio State University, 1901; M.D., University of Pennsylvania, 1905; A.M., Harvard University, 1906; Pathological Service, Boston City Hospital, July, 1905–January, 1907; Pathologist, Columbus State Hospital, Columbus, Ohio, 1907; St. Ann's Hospital Laboratory, Anaconda, Montana, 1908–10; Worcester State Hospital, January, 1910–October, 1912; Assistant in Neuropathology, Harvard Medical School, 1910 and 1911; Instructor, 1912; Clinical Director and Pathologist, Worcester State Hospital, October, 1912–.

THEODATE L. SMITH, PH.D. — 23 Maywood St.

Lecturer and Librarian in the Children's Institute

A.B., Smith College, 1882; A.M., 1884; Student, Yale University, 1893–95; Special Student, Clark University, 1895–96; Ph.D., Yale University. 1896; Cornell University, 1900; Assistant to President Hall in research work under Carnegie grant, Clark University, 1902–04; Estabrook grant, October, 1904–February, 1905; Berlin University, April–August, 1905; Research Assistant to President Hall, Clark University, 1905–09; Lecturer and Librarian in the Children's Institute, 1909–.

AMY ELIZA TANNER, PH.D., Faribault, Minnesota

Research Assistant to President Hall — 90 Florence St.

A.B., University of Michigan, 1893; Scholar, University of Chicago, 1894–95; Fellow, 1895–98; Ph.D., University of Chicago, 1898; Associate in Philosophy, 1898–1902; Professor of Philosophy, Wilson College, 1903–07; Honorary Fellow in Psychology, Clark University, 1907–09; Lecturer in the Children's Institute, 1909–11; Research Assistant to President Hall, 1911–.

RADOSLAV ANDREA TSANOFF, PH.D.

Instructor in Philosophy — 109 Lovell St.

A.B., Oberlin College, 1906; Scholar in Philosophy, Cornell University, 1907–08; Susan Linn Sage Fellow, 1908–10; Ph.D., 1910; engaged in research at Columbia University, 1910–12.

HONORARY FELLOWS

JAMES ATKINS BULLARD, A.B.

Honorary Fellow in Mathematics — 18 Walnut St.

A.B., Williams College, 1908; Instructor in Mathematics, Worcester Polytechnic Institute, 1908–; Student in Mathematics, Clark University, 1908–11: Honorary Fellow, 1911–.

ARTHUR DEXTER BUTTERFIELD, A.M.

Honorary Fellow in Mathematics — 10 Schussler Road

B.S., Worcester Polytechnic Institute, 1893; M.S., 1898; A.M., Columbia University, 1904; Instructor in Civil Engineering, Worcester Polytechnic Institute, 1894–98; Instructor in Mathematics, Engineering Department, University of Vermont, 1898–1900; Assistant Professor, 1900–04; Professor of Mathematics and Mechanics, 1904–08; Assistant Professor of Mathematics, Worcester Polytechnic Institute, 1908–10; Professor, 1910–; Student in Physics and Mathematics, Clark University, 1908–09; Honorary Fellow in Mathematics, 1909–.

ELNORA WHITMAN CURTIS, PH.D.

Honorary Fellow in Psychology — Burncoat St.

A.B., Smith College, 1892; Scholar in Psychology, Clark University, 1907–08; A.M., 1908; Honorary Fellow in Psychology, 1908–; Ph.D., 1910.

IRVING ANGELL FIELD, A.M., Granville, Ohio

Honorary Fellow in Biology — 5 Enfield St.

B.S., Denison University, 1903; Instructor in Ornithology, 1902–03; Assistant in Zoology, Harvard University, 1903–05; Austin Teaching Fellow, 1905–06; Professor of Chemistry and Biology, Western Maryland College, 1906–11; A.M., Harvard University, 1912; Instructor in Biology, Clark College, 1911–; Honorary Fellow in Biology, Clark University, 1911–.

JAMES EDMUND IVES, PH.D.

Honorary Fellow in Physics — 1030 Main St.

Assistant Curator, Academy of Natural Sciences, Philadelphia, 1887–93; Instructor in Physics, Drexel Institute, 1893–97; Jessup Student, Academy of Natural Sciences, Philadelphia, 1887–91; Student in Histology and Embryology, University of Pennsylvania, 1888–89; Student in Mathematics, 1893–95; Student in Physics, Cavendish Laboratory, Cambridge, England, 1896; Scholar in Physics, Clark University, 1897–98; Fellow, 1898–1901; Ph.D., 1901; Instructor in Physics, University of Cincinnati, 1901–03; Assistant Professor, 1905–10; Associate Professor, 1910–12.

KARL JOHAN KARLSON, PH.D., Myresjo, Sweden
Honorary Fellow in Psychology 6 Wyman St.

A.B., Clark College, 1909; Scholar in Psychology, Clark University, 1909–10; A.M., 1910; Fellow, 1910–12; Ph.D., 1912.

JOHN MILTON MCINDOO, PH.D.
Honorary Fellow in Psychology 104 Woodland St.

A.B., Antioch College, 1900; Instructor in English, Antioch College, 1899–1900; Instructor in Psychology and Pedagogy, Chattanooga Normal School, 1900–01; Instructor in Psychology and Pedagogy, Northern Illinois Normal School, 1901–03; Instructor in Pedagogy and English, Junior State Normal School, Broken Bow, Neb., 1906–09; Scholar in Pedagogy, Clark University, 1909–10; A.M., 1910; Fellow, 1910–12; Ph.D., 1912; Honorary Fellow in Psychology, September–December, 1912.

FREDERICK THOMAS MAYER-OAKES, PH.D., Stoughton
Honorary Fellow in Anthropology

A.B., Kansas City University, 1905; A.M., Leander Clark College, 1908; B.D., Kansas City University, 1909; Graduate Student in Anthropology, Yale University, 1909–10; Ph.D., Kansas City University, 1910; Scholar in Anthropology, Clark University, 1910–11; A.M., 1911; Fellow, 1911–12.

CAREY EYSTER MELVILLE, A.B.
Honorary Fellow in Mathematics 3 Ferdinand St.

A.B., Northwestern University, 1901; Fellow in Mathematics, 1901–02; Graduate Student in Mathematics, Johns Hopkins University, 1902–03; Instructor in Mathematics, Case School of Applied Science, 1903–06; Honorary Fellow in Mathematics, Clark University, 1906–; Assistant in Mathematics, Clark College, 1906–09; Instructor, 1909–10; Instructor in Mathematics and Physics, 1910–11; Assistant Professor, 1911–.

FRANK K. SECHRIST, PH.D.
Honorary Fellow in Psychology 46 May St.

Ph.B., Lafayette College, 1892; Professor of English, State Normal School, Lock Haven, Pa., 1892–99; Graduate Student, Lafayette College, 1893–98; Ph.D., 1898; Professor of Psychology and Pedagogy, State Normal School, Lock Haven, Pa., 1899–1900; Professor of English, State Normal School, Stevens Point, Wis., 1900–10; Professor of English and Modern Languages, Rhode Island State College, 1910–12; Graduate Student, Harvard University, 1911.

FELLOWS

ARTHUR KENNEDY BEIK, Ped.M., Wapello, Iowa
Fellow in Pedagogy 104 Woodland St.

Ph.B., Grinnell College, 1908; Ped.M., School of Pedagogy, New York University, 1909; Fellow in Pedagogy, Clark University, 1911–.

RAYMOND BELLAMY, A.B., Moores Hill, Indiana
Fellow in Psychology — 23 King St.

A.B., Moores Hill College, 1910; Professor of Chemistry and Physics, 1910–12.

GEORGE DAVIS BIVIN, A.M.
Fellow in Psychology — 7 Shirley Terrace

A.B., Clark College, 1909; Scholar in Psychology, Clark University, 1909–10; A.M., 1910; Fellow, 1910–.

IVY GERTRUDE CAMPBELL, A.M., Malvern, Iowa
Fellow in Psychology — 15 Lagrange St.

A.B., University of Colorado, 1911; Scholar in Psychology, Clark University, 1911–12; A.M., 1912.

ANNA BROWN COPELAND, A.M., Rochester, New York
Fellow in Psychology — 10 Chatham St.

Ph.B., University of Rochester, 1909; A.M., Radcliffe College, 1912.

KATHERINE ELLA DOLBEAR, A.M., Arlington
Fellow in Biology — 145 Woodland St.

Student, Tufts College, 1893–95; 1900–01; Massachusetts Institute of Technology, 1896–97; Student in Biology, Clark University, 1901–02; Scholar, 1911–12; A.M., 1912.

ERWIN OLIVER FINKENBINDER, A.M., Kent, Illinois — 900 Main St.
Fellow in Psychology and Research Assistant to Dr. Baird

Graduate, Northern Illinois State Normal School, 1908; A.B., University of Illinois, 1910; Fellow in Psychology and Research Assistant to Dr. Baird, Clark University, 1910–; A.M., 1911.

SARA CAROLYN FISHER, A.M., Chicago, Illinois
Fellow in Psychology — 15 Lagrange St.

A.B., Lombard College, 1909; A.M., University of Illinois, 1910; Fellow in Psychology, Clark University, 1910–.

GEORGE EARL FREELAND, A.B., Emporia, Kansas
Fellow in Psychology — 9 Woodbine St.

A.B., Kansas State Normal School, 1909.

ALBERT NICOLAY GILBERTSON, A.M., North Grafton
Fellow in Anthropology

A.B., University of Minnesota, 1908; A.M., 1909; Assistant in Sociology and Anthropology, University of Minnesota, 1908–09; Instructor in Psychology and Anthropology, University of Colorado, 1909–10; Instructor in Psychology, University of

Minnesota, 1910–12; Instructor in Psychology and Child-Study, Minneapolis Kindergarten Normal School, and Lecturer in Psychology and Pedagogy, Minneapolis Normal Art School, 1911–12.

ARTHUR EDWARD HAMILTON, Mexico City, Mexico
Fellow in Psychology — 101 May St.

Student in Psychology, Clark University, 1911–12.

ERNEST HAMMOND, A.M., Milan, Ohio
Fellow in Pedagogy — 5 Clifton St.

Pd.B., Ohio University, 1910; Scholar in Pedagogy, Clark University, 1910–11; A.M., 1911; Fellow, 1911–.

ARTHUR CLARK HARRINGTON, A.M., Berwick, Maine
Fellow in Psychology — 20 Winslow St.

A.B., Boston University, 1909; A.M., 1911.

MARION MYRL HARRISON, B.S., Philpot, Kentucky
Fellow in Chemistry — 8 Loudon St.

B.S., Kentucky State University, 1912.

JOSHUA ALLEN HUNTER, PH.D., Tyrone, Pennsylvania
Fellow in Pedagogy — 21 Florence St.

A.B., Pennsylvania State College, 1905; Instructor in Latin, State Normal School, Millersville, Pa., 1905–06; Graduate Student, Yale University, 1906–07; Instructor in Psychology and Pedagogy, State Normal School, Millersville, Pa., 1907–11; A.M., Pennsylvania State College, 1908; Ph.D., Kansas City University, 1909; Scholar in Pedagogy, Clark University, 1911–12; Fellow, September–December 15, 1912.

ARTHUR TABER JONES, B.S.
Fellow in Physics — 25 Ripley St.

B.S., University of Chicago, 1899; Graduate Scholar in Physics, University of Chicago, 1899–1900; Assistant in Physics, Purdue University, 1902–03; Instructor, 1903–06; Assistant Professor, 1906–11; Fellow in Physics, Clark University, 1911–.

SAKYO KANDA, A.M., Tokyo, Japan
Fellow in Psychology — 3 Ferdinand St.

Graduate, Kansei Gakuin, 1900; Scholar in Psychology, Clark University, 1907–08; Fellow, 1908–10; A.M., 1909; Scholar, 1911–12.

RANSOM A. MACKIE, A.M., Pullman, Washington
Fellow in Psychology — 2 Ripley Place

Student, Eugene University, Wash., 1906–08; University of Washington, 1908–09; Idaho State University, 1909–10; Scholar in Psychology, Clark University, 1911–12; A.M., 1912.

WILLIAM BRYANT PERRY, A.M.
Fellow in Psychology — 13 Parker St.

B.D., Bishop Payne Divinity School, Va., 1898; A.B., Lotta University, N. C., 1908; Student in Psychology, Clark University, 1910–11; A.M., 1911; Scholar, 1911–12.

DONALD IRVING POPE, A.B., Red Cloud, Nebraska
Fellow in Psychology — 13 Gates St.

A.B., University of Nebraska, 1898; Fellow in Sociology, University of Chicago, 1910–11.

WALLACE FRANK POWERS, A.M., Spencer
Fellow in Physics — 67 Charlotte St.

A.B., Clark College, 1910; Assistant in Physics, 1910–; Scholar in Physics, Clark University, 1910–11; A.M., 1911; Fellow, 1911–.

ROY FRANKLIN RICHARDSON, A.B., Emporia, Kansas
Fellow in Psychology — 101 May St.

A.B., Kansas State Normal College, 1909; Fellow in Psychology, Clark University, 1910–.

KIRKMAN KENSON ROBINSON, A.M., Wilderville, Oregon
Fellow in Psychology — 101 Fairfield St.

A.B., University of Oregon, 1907; A.M., 1908; Scholar in Psychology, Clark University, 1910–11; Fellow, 1911–.

LILLIAN ROSANOFF, A.M., New York City
Fellow in Chemistry — 7 Downing St.

A.B., Barnard College, 1908; A.M., Columbia University, 1911.

WILLIAM THOMAS SANGER, A.M., Empire, California
Fellow in Psychology — 28 Hollywood St.

A.B., Bridgewater College, 1909; A.M., Indiana University, 1910; Professor of Philosophy and History, Bridgewater College, 1910–12.

JOHN FREDERIC WILLIAM SCHULZE, A.M., New York City
Fellow in Chemistry and Research Assistant to Dr. Rosanoff
23 Downing St.

B.S., New York University, 1911; W.H. Inman Fellow, New York University, 1911–12; Fellow in Chemistry and Research Assistant to Dr. Rosanoff, Clark University, 1911–; A.M., 1912.

WAYNE PRESCOTT SMITH, PH.D., Seattle, Washington
Fellow in Pedagogy — 14 Gardner St.

A.B., University of Wooster, 1891; A.M., 1892; Ph.D., 1893; Graduate Student, Harvard University, 1892–93; A.B., 1893; Graduate Student, University of Chicago, 1894–95, 1898–99; Honorary Fellow and Lecturer in Philosophy, 1894–95; Professor of Psychology and Education, California State Normal Schools, San José, 1895–96; Los Angeles, 1904–08.

ADELE ADAMS STEELE, A.M., Columbia, Missouri
Fellow in Pedagogy — 442 Park Ave.

A.B., Potter College, 1907; Principal, Normal Department, Western Union College, 1909–10; Scholar in Pedagogy, Clark University, 1910–11; A.M., 1911; Fellow in Pedagogy, 1911–.

ASA GEORGE STEELE, LL.D., Columbia, Missouri
Fellow in Psychology — 442 Park Ave.

B.S., University of Missouri, 1901; Professor of Physics and Chemistry, University of Chattanooga, 1904–05; Professor of Sciences, Ogden College, 1906–07; President, Clarksville College, 1907–08; LL.D., Bowdon College, 1908; Professor of Mathematics and Sciences, Western Union College, 1908–10; Fellow in Psychology, Clark University, 1910–; A.M., 1911.

HAROLD FREDERIC STIMSON, A.M., Rochdale — 8 Loudon St.
Fellow in Physics and Research Assistant to Dr. Webster

A.B., Clark College, 1910; Scholar in Physics, Clark University, 1910–11; A.M., 1911; Fellow in Physics and Research Assistant to Dr. Webster, 1911–.

MIRIAM VAN WATERS, A.M., Portland, Oregon
Fellow in Anthropology — 11 Richards St.

A.B., University of Oregon, 1908; Assistant, 1909–10; A.M., 1910; Fellow in Psychology, Clark University, 1910–12.

ELIZABETH LINDLEY WOODS, A.M., Portland, Oregon
Fellow in Psychology — 11 Richards St.

A.B., University of Oregon, 1905; Assistant Instructor in English Literature, 1905–06; A.M., 1910; Scholar in Psychology, Clark University, 1910–11; Fellow, 1911–.

SOSHICHI YAMADA, A.M., Shizuoka, Japan
Fellow in Pedagogy — 2 Oliver St.

Graduate, Aoyama College, Tokyo, Japan, 1906; A.B., De Pauw University, 1910; Fellow in Pedagogy, Clark University, 1910–; A.M., 1911.

Elias Yanovsky, A.M., St. Petersburg, Russia
Fellow in Chemistry — 83 Birch St.

Graduate, University of St. Petersburg, 1911; Fellow in Chemistry, Clark University, 1911–; A.M., 1912.

Scholars

Samuel Flagg Bemis, A.B.
Scholar in History — 30 Hamburg St.

A.B., Clark College, 1912; Assistant in History, 1912–.

Lawrence Whitney Brigham, A.B.
Scholar in History — 55 May St.

A.B., Clark College, 1912.

Walter Guy Butler, A.B.
Scholar in Economics — 29 Maywood St.

A.B., Clark College, 1912; Assistant in Economics, 1912–.

Harry Joseph Cahill, A.B.
Scholar in Psychology — 101 Gage St.

A.B., Holy Cross College, 1912.

Fred Winfred Chaplin, A.B.
Scholar in Economics — 319 Lovell St.

A.B., Clark College, 1911.

Samuel Claman, Fitchburg
Scholar in Pedagogy — 48 Hollywood St.

Graduate, State Normal School, Fitchburg, Mass., 1902; Scholar, Clark University, 1910–11; Instructor in Pedagogy, Howard University, 1911–12.

Charles Henry Cummings, A.B., West Boylston
Scholar in Pedagogy

A.B., Clark College, 1912.

Raymond Augustine Dunphy, A.B., North Brookfield
Scholar in Chemistry — 18 Hammond St.

A.B., Clark College, 1912.

John Joseph Finneran, A.B.
Scholar in Psychology — 158 Shrewsbury St.

A.B., Holy Cross College, 1912.

JOHN JOSEPH HORAN, A.B.
Scholar in Psychology — 71 Granite St.
A.B., Holy Cross College, 1912.

BAITEN HORI, Tokyo, Japan
Scholar in Psychology — 91 Lovell St.
Graduate, Keiogijuku University, Tokyo, Japan, 1911.

HENRY JACOBSON, A.B., Leicester
Scholar in History
A.B., Clark College, 1912.

GEORGE ELLIS JONES, A.B., Centerville, Iowa
Scholar in Pedagogy — 145 Woodland St.
A.B., Kansas State Normal School, 1909.

JOSEPH KHOTIMLANSKY, St. Petersburg, Russia
Scholar in Chemistry — 24 Beaver St.
Graduate, St. Petersburg Gymnasium, 1907.

ABRAHAM MANDELSTAM, A.B., New York City
Scholar in Pedagogy — 20 Richards St.
A.B., College of the City of New York, 1903; Graduate Student, New York University, 1907–08; Fellow in Pedagogy, Clark University, 1911–12.

ARTHUR MONROE, A.M., Spencer
Scholar in History
A.B., Amherst College, 1897; Student, Harvard Law School, 1897–99; Student in History, Clark University, 1910–11; A.M., 1911; Scholar, 1911–.

HAROLD ARTHUR MORTON, A.B.
Scholar in Chemistry — 8 Pelham St.
A.B., Clark College, 1912.

JOHN JOSEPH ALOYSIUS NUGENT, A.B.
Scholar in Psychology — 52 Southgate St.
A.B., Holy Cross College, 1912.

FRANCIS JOHN O'BRIEN, A.B.
Scholar in Psychology — 69 East Central St.
A.B., Holy Cross College, 1912.

GEORGE BERNARD O'FLYNN, B.S.
Scholar in Pedagogy — 33 Hamilton St.
B.S., Massachusetts Agricultural College, 1912.

GEORGE ALBERT PROHASKA, A.B.
Scholar in Psychology — 118 Belmont St.
A.B., Holy Cross College, 1912.

ALLAN GALE RICE, A.B.
Scholar in History — 862 Main St.
A.B., Clark College, 1910; Scholar in History, Clark University, 1910–.

CLARENCE PROUTY SHEDD, A.B.
Scholar in History — 4 Riedl Place
A.B., Clark College, 1909; Scholar in History, Clark University, 1911–.

JOHN FRANCIS SULLIVAN, A.B.
Scholar in Psychology — 28 Arlington St.
A.B., Holy Cross College, 1909.

FRANCIS ALOYSIUS TOBIN, A.B.
Scholar in Pedagogy — 69 Gage St.
A.B., Holy Cross College, 1912.

FRANCES WASHINGTON TUFTS, A.B.
Scholar in Biology — 562 Pleasant St.
A.B., Wellesley College, 1909; Student in Biology, Clark University, 1910–11; Scholar, 1911–.

RAYMOND HOLDER WHEELER, A.B., Berlin
Scholar in Psychology — 27 Downing St.
A.B., Clark College, 1912; Assistant in Psychology, 1912–.

OTHER STUDENTS

EARL VAN DUSEN BURDICK, A.B., Hamilton, New York
Student in Psychology — 38 William St.
A.B., Colgate University, 1911; Instructor in French and German, Worcester Polytechnic Institute, 1911–; Student in Psychology, Clark University, 1911–.

HERBERT KIMBALL CUMMINGS, B.S., West Boylston
Student in Physics

B.S., Worcester Polytechnic Institute, 1910; Instructor in Physics and Chemistry, Alfred University, 1910–11; Instructor in Physics, Worcester Polytechnic Institute, 1911–; Student in Physics, Clark University, 1911–.

BERTHA CAROLINE DOWNING, M.D.
Student in Pedagogy 4 Downing St.

Harvard Annex, 1887; M.D., Woman's Medical College of Pennsylvania, 1896; Honorary Fellow in Psychology and Biology, Clark University, 1905–06; Honorary Fellow in Psychology, 1906–07; Student, 1909–10; A.M., 1910; Student in Anthropology, 1910–11; Student in Pedagogy, 1911–; Member American Association for the Study of the Feeble-Minded; Fellow of American Academy of Medicine.

ARTHUR OLIN GRIGGS, PH.B., Westford, Connecticut
Student in Pedagogy

Ph.B., Wesleyan University, 1898; Professor of Mathematics, Virginia Union University, 1903–05; Scholar in Pedagogy, Clark University, 1906–07; 1910–11; Fellow, 1911–12.

WILLIAM HENRY HAYES, A.B., Oxford
Student in Psychology

A.B., Wesleyan University, 1895; Student, Yale Divinity School, 1898–1901.

MESROB KEVORK JAMGOTCHIAN, A.M.
Student in Pedagogy 105 Summer St.

A.B., Euphrates College, Harpoot, Turkey, 1902; A.M., Yale University, 1912.

PEYSAH LEYZERAH
Student in Mathematics 71 Penn Ave.

Graduate, Dinaburg Real Gymnasium, 1911.

GEORGE WINFIELD MORRIS, A.B., Marlboro
Student in History

A.B., Brown University, 1898.

NELLIE MANN OPDALE, Marlboro
Student in Psychology

Student in Psychology, Clark University, 1907–.

CARL LISLE PERCY, B.D., Charlton
Student in Sociology

A.B., Middlebury College, 1907; Instructor in English, Atlanta Theological Seminary 1909–11; B.D., 1911; Student in Sociology, Clark University, 1911–.

CHARLES MOEN RICE, A.B.
Student in Mathematics 9 Bowdoin St.

A.B., Harvard University, 1882; Student in Mathematics, Clark University, 1909–.

ANCEL ST. JOHN, PH.B.
Student in Physics 53 Queen St.

Ph.B., University of Rochester, 1906; Instructor in Physics, Syrian Protestant College, Beirut, Syria, 1906–09; Assistant in Physics, Columbia University, 1909–10; Acting Professor of Physics, Emory and Henry College, 1910–12; Instructor in Physics, Worcester Polytechnic Institute, 1912–.

EDWARD BUTLER SAUNDERS, A.B., Fitchburg
Student in Psychology

B.D., St. Lawrence University, 1900; A.B., 1904; Student in Psychology, Clark University, 1906–.

ANNA ELDON SECHRIST
Student in Psychology 46 May St.

Graduate, State Normal School, Lock Haven, Pa., 1894.

IVY GIRVIN SMITH, Seattle, Washington
Student in Pedagogy 14 Gardner St.

Graduate, Hawaiian Territorial Normal School, 1898; California State Normal School, Los Angeles, 1906; Student in Education, University of California, 1904–05.

MARY ALICE WAITE, A.B.
Student in Sociology 105 Elm St.

A.B., Smith College, 1904; Student in Economics and Pedagogy, Clark University, 1910–12.

EDWARD CLINTON WILSON, A.B., Knoxville, Tennessee
Student in Psychology

A.B., Milligan College, 1887; Student in Psychology, Clark University, November 11–December 18, 1912.

HARRY CARL WILSON
Student in Psychology 64 Coburn Ave.

Student, Baker University, 1903–05; Student, Boston University School of Theology, 1908–11.

ALEXANDRA YANOVSKY, St. Petersburg, Russia
Student in Psychology 83 Birch St.

ATTENDANTS UPON SATURDAY COURSES

BERTHA I. BIRD, Auburn
GEORGE H. BOYDEN, Worcester
WILLIAM F. BUTLER, Worcester
ELIZABETH S. CAMPBELL, Worcester
CHARLES S. CARROLL, Worcester
GEORGE A. COE, Hopedale
KATHERINE A. COOK, Worcester
OLIVER R. COOK, Worcester
FRANCIS J. DOLAN, Worcester
EDITH A. GAINSMAN, Worcester
RUTH J. JOHNSON, Worcester
MABEL T. KNEELAND, Worcester
MARIE P. LACOUTURE, Millbury
GRACE E. OLIVER, Worcester
LUCY A. OSBORNE, Worcester
JOHN F. ROCHE, Worcester
KATE E. SMITH, Worcester
ELLEN D. TOLMAN, Auburn

UNDERGRADUATES ATTENDING ONE OR MORE UNIVERSITY COURSES

PENG CHUN CHANG
TETSUTARO NAKANISHI
DONALD R. TAFT
EARL W. THOMSON

FLORENCE CHANDLER 938 Main St.
Bursar, and Clerk of the University

ELIZABETH ANNA FELT 19 Bowdoin St.
Assistant in the Bursar's office

Mary Evelyn Fitzsimmons, S.B. 90 Florence St.
Private Secretary to the President

Instructors	25
Fellows, Scholars and Students	90
Saturday Courses	18
Undergraduates	4
Total	137

ADMINISTRATION

The trustees are the ultimate source of authority in all matters pertaining to the University. They act collectively, through committees, and also through the President of the University.

Duties of the President of the University

The duties of this office were defined by the Trustees, May 23, 1889, as follows:

The President of the University shall consult frequently with the Trustees on all matters that concern the welfare of the University, and attend the meetings of the Board. He shall confer with each instructor concerning the development of his department, determine the duties and authority of each, and preside at the meetings of the Faculty. He shall be the authorized medium of communication between the Board of Trustees and the officers of instruction, individually and collectively, in all matters involving the administration of the University. The enactments of the Board concerning instructors and their work, and all requests, complaints and proposals from the Faculty to the Trustees shall be made known through him. He shall exercise or provide such superintendence over buildings, apparatus, books and other property, as will secure their protection and appropriate use. Expenditures must not be ordered by any instructor of the University without his previous consent or the express authority of the Board.

These duties were more fully defined by By-Laws enacted by the Corporation, Sept. 26, 1889. These are as follows:

BY-LAWS

1. The President of the University shall preside on all public academic occasions, shall direct the official correspondence, study the wants and interests of the whole University and exercise a general superintendence over all its concerns. His first care, and that of the authorities of the University, shall be the departments already established, and next those closely related to them; but no other department shall be established until those already introduced have been brought to the highest state of efficiency then possible. All acts, however, which shall involve the expenditure of money in the administration of the University's affairs, shall be subject to the approval of the Board of Trustees or the Finance Committee for the time being.

2. As the efficiency of a University depends chiefly upon the quality of its Faculty, the Board of Trustees will hold the President to a strict but reasonable accountability for the fidelity and ability of each instructor. The President only shall have the power to select and appoint all officers of instruction, subject to the approval of the Board of Trustees. To make wise and well-considered appointments, to maintain harmony within the Faculty, and to increase their efficiency in research and instruction shall be his most important duty. If at any time the President shall be negligent in the discharge of these or other duties, or is from any cause disabled from discharging them, they may be exercised by the Board of Trustees.

3. The President of the University shall be the medium of communication between the Trustees and Instructors, individually and collectively, upon all matters within the field of

action of either body. He shall attend all meetings of the Board of Trustees, of which he shall be notified, and shall participate in their deliberations, but without the power to vote. All complaints and requests from members of one body to the other shall be made through him.

4. The President shall call and preside over all official meetings of the Instructors, and a record of their proceedings shall be kept. These records are in no case to be made known to others than the Trustees. They shall always be in the custody of the President, but may be inspected by the Trustees, or either of them, at any time.

5. The President of the University, in the absence of the Trustees or Finance Committee, shall have the entire direction and control of the persons employed about the University and not engaged in the work of instruction; the duties of all such persons shall be assigned and they shall be appointed or removed by him, subject to the approval of the Finance Committee.

6. No instructor shall order any books or apparatus, or anything connected with the work of instruction (beyond his appropriation), without the approval of the President. No expense for the care of buildings or grounds, nor for alterations or repairs within and upon the same shall be made without the approval of the Board of Trustees or the Finance Committee, such alterations or repairs in no case to exceed the appropriations made for that purpose. If the Trustees, or Finance Committee,or any person, shall make contracts in behalf of the University without authority, the officer or person making such contract shall become individually responsible therefor.

7. The officers of instruction shall be appointed for a term of from one to five years. At the end of this period the work of each instructor will be subjected to a careful scrutiny upon the results of which his reappointment shall depend, always provided, however, that any Instructor will be liable to be dis-

charged at any time for incapacity, neglect of duty or for such other cause as shall seem good to the Trustees.

8. Each Instructor shall give stated lectures to however few. He shall actively and zealously strive to maintain the highest possible standard, shall work in a spirit of hearty sympathy and coöperation, and shall encourage research by precept and, if possible, by example.

9. The foregoing By-Laws are intended to embody the provisions contained in a vote passed by the corporation on the twenty-third day of May, A.D. 1889, upon the motion of Judge Devens. (See above.) If at any time hereafter any discrepancy shall be found to exist between the two, said By-Laws shall be so far modified as to conform to the provisions of said vote.

10. No instructor shall engage in any outside professional or technical pursuit without the approval of the Board, the Finance Committee, or the President.

11. These By-Laws, or any one of them, may be changed, amended, or repealed by a vote of three-fourths at least of the Trustees at any meeting of their Board duly called, notified, and held for that purpose.

GENERAL STATEMENTS

The University now consists of nine departments, in which all its work and that of Instructors, Fellows and Scholars is grouped.

These departments are as follows:

I. Mathematics
II. Physics
III. Chemistry
IV. Biology
V. Anthropology
VI. Psychology
VII. Pedagogy
VIII. Economics and Sociology
IX. History

The Faculty

The Faculty elect Fellows and take action upon general requirements for the Doctor's and Master's degrees and other promotions, act and advise upon whatever may be officially submitted to them by the Board or by the President, and consider all matters not otherwise provided for and in which all departments of the University are alike interested.

Admission

Only graduate students or those of equivalent attainments are admitted to full membership in the University, except in rare and special cases.

At present no entrance examinations are required; but by testimonials, diplomas, personal interviews, or written specimens of work, the authorities must be satisfied that the applicants have scholarship enough to work to advantage, and zeal and ability enough to devote themselves to their chosen field. The methods of the University are too costly, and its energy and funds too precious, to be spent upon those who are not well trained, promising and in earnest.

It is highly desirable that candidates entering any of the nine departments shall have, beside a knowledge of the other subjects commonly taught in colleges, a reading knowledge of French and German.

For the select students who are received, it is the purpose of the University to open all its privileges and to supply every incentive possible in the way of books, facilities, and, above all, direct personal stimulus. The chief as well as the best work of this University is individual and involves daily suggestion, encouragement and direction. The limited number of students permits more or less personal instruction in each case.

Classes of Appointees

No clearly marked line exists between students and instructors. Fellows who have attained some degree of mastery in a special line of work sometimes give brief special courses, which may be attended by professors.

This is a stimulus to the student, and both tests and exhibits power in teaching.

I. DOCENTS

The highest residential appointment not involving membership in the Faculty is that of Docent. These positions are designed for men of marked gifts and attainments who have at least attained the doctorate and wish to engage in research, teaching, or both.

Class A. Free Docents

Each docent of this class will be expected to deliver a limited number of lectures on some topic within his department. In so doing, he shall be entirely independent of other instructors both in his choice of special topic and his manner of treating it, and responsible only to the President of the University, by whom he shall be appointed after consultation with the head of the department. The free docent shall have command of the resources of the department in the way of books, apparatus, etc., so far as this does not interfere with its regular work. By establishing free docents, the Faculty desires not only to maintain and guarantee the fullest academic freedom, but to expose itself to all the stimulus that can come by the rivalry of younger or outside men, and to introduce new topics and new departures in old ones.

Class B. University Docents

A University docent shall engage in research and may collaborate with the head of the department or other

member of the Faculty and supplement his work. He shall be appointed by the head of the department with the approval of the President.

Habilitation of Docents

A docent of either class may prepare and read in public an habilitation address representing original work after a term of service of a length and under conditions to be determined by the Faculty for each individual case. Upon doing this, he may be formally presented with a certificate or diploma granting him the *venia docendi* or licentiate, which shall not be a title or degree, but shall attest his fitness as scholar or investigator for an academic position and shall be regarded by the University as a brevet collegiate professorship. The fee for such a certificate shall be $25, which the Faculty shall have power to remit. The compensation of a docent of either class, if any, shall be determined by the President, and the fees to be paid him by students, if any, shall be determined by the Bursar.

It is believed that the difficulties of college authorities in selecting suitable professors may be somewhat diminished by the existence of such a select body of scholars of guaranteed scientific training, ability, and approved power to teach, and that this new grade may aid in raising the standard of academic scholarship.

II. QUIZ MASTERS

Each member of the University Faculty may, with the approval of the President, appoint one or more quiz masters who with the aid of his lecture notes, or

otherwise, shall conduct review classes upon his lectures and who may hold preliminary tests, but who shall not lecture or give instruction save as review. These positions shall be regarded as honorary and as a privilege of more advanced students in perfecting their own knowledge and acquiring practice in instruction.

III. NON-RESIDENT LECTURERS

The representatives of each department may, with the approval of the President, bring eminent experts for exchange or other lectures of a special nature at any time during the academic year. They may also in return, with the approval of the President, give similar brief courses in other institutions, provided this does not interfere with their full efficiency for the work of this University.

IV. HONORARY FELLOWS

Those who have already advanced to the Doctor's degree may be appointed Honorary Fellows and given the privileges of the University, including those of the Library. In past years many who have already taken this degree, either in this country or abroad, and who are awaiting academic appointment, have found these positions both helpful for their own further research and development and also advantageous for obtaining the collegiate and university appointments that they seek.

V. CANDIDATES FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

Candidates for the Doctor's degree must have previously taken the Degree of Bachelor of Arts or have had

a substantial equivalent for the training implied by that degree.

At least one year, but in most cases three years, of graduate work are necessary for this degree. Examinations for it, however, may be taken at any time during the academic year when, in the judgment of the University authorities, the candidate is prepared, provided the requirement of one year's residence has been absolved.

For this degree one requirement is a dissertation upon an approved subject, to which it must be an original contribution of value. To this capital importance is attached. It must be reported on in writing by the chief instructor before the examination, printed at the expense of the candidate, and at least one hundred copies given to the University. However, in case of a dissertation of unusual length, or containing expensive plates, the Faculty shall have power, at the request of the candidate, to reduce this number of presentation copies to fifty.

Such formal or informal tests as the Faculty may determine shall mark the acceptance of each student or Fellow as a candidate for this degree. One object of this preliminary test shall be to insure a good reading knowledge of French and German. Such formal candidature shall precede the examination itself by a period prescribed in the special rules below.

The fee for the Doctor's degree is $25, payable before the examination. The presentation copies of the dissertation must be in the hands of the Librarian before the diploma is delivered. In exceptional cases, and by special action of the Faculty, the act of promotion may precede the presentation of the printed copies of the dissertation.

An oral, but no written, examination is required upon at least one minor subject in addition to the major before an examining jury composed of at least four members, including the head of the department and the President of the University, who is authorized to invite any person from within or without the University to be present and to ask questions. The jury shall report the results of the examination to the Faculty, who will recommend satisfactory candidates for the degree.

For the bestowal of this degree, the approbation of the Board of Trustees must in each case be obtained by their signature upon the diploma. They desire that the standard of requirements for it be kept the highest practicable, that it be reserved for those of superior ability and attainment only, and that its value be never suffered to depreciate.

It is to the needs of candidates for this degree that the lectures, seminaries, laboratories, collections of books, apparatus, etc., are especially shaped, and no pains will be spared to afford them every needed stimulus and opportunity. It is for them that the Fellowships and Scholarships are primarily intended, although any of these honors may be awarded to others.

On November 14th, 1900, the following vote was passed by the Board of Trustees:

That the University will admit candidates for the degree of Doctor of Philosophy and will confer that degree without regard to sex.

Special Rules concerning the Doctor's Degree

I. *Residence.* No candidate shall receive the degree of Doctor of Philosophy without at least one academic year's previous residence.

II. *Candidature for the Doctor's Degree.* Every applicant for the Doctor's degree shall fill out, before October fifteenth, the regular application blank provided at the office. This schedule shall be submitted to the head of the department. Before affixing his signature he shall satisfy himself, in such manner as he may desire, as to the fitness of the applicant.

III. When countersigned, this schedule shall be filed with the President, and the applicant will be examined in French and German by the annual committee for that purpose.

IV. In case of a favorable report by this committee, the applicant shall be a regular candidate for the degree.

V. Candidates complying with all preliminary conditions, including the examinations in French and German, before November first will be allowed to proceed to the doctor's examination at any time between May fifteenth following and the end of the academic year.

VI. *The Doctor's Dissertation.* The dissertation must be presented to the instructor under whose direction it is written, and reported upon by him before the doctor's examination. In every case the dissertation shall be laid before the jury of examination, at the time of examination, in form suitable for publication. This provision shall not, however, preclude the making of such minor changes later as the chief instructor may approve.

VII. The dissertation shall be printed at the expense of the candidate and the required copies deposited with the Librarian within one calendar year after the first of October following the examination. The candidate alone will be held responsible for the fulfilment of these conditions.

VIII. The favorable report of the chief instructor, filed in writing with the Clerk of the University, shall be a sufficient imprimatur or authorization for printing as a dissertation. The printed copies shall bear upon the cover and title page the statement of approval in the following words, over the signature of the chief instructor:

> A Dissertation submitted to the Faculty of Clark University, Worcester, Mass., in partial fulfilment of the requirements for the degree of Doctor of Philosophy, and accepted on the recommendation of
>
> (NAME OF CHIEF INSTRUCTOR)

IX. *Examinations for the Doctor's Degree.* The examinations for the doctor's degree may be held at any time during the academic year, provided that at least one academic year has elapsed since the completion of the preliminaries of candidature, except in the case of fulfilment of these conditions between the beginning of any academic year and November first of that year, to which case Rule V applies. The examinations shall be held at such hours and places as the President may appoint.

X. Examinations may also be held during the regular vacations of the University, but for these an additional fee of five dollars to each examiner and the reasonable travelling expenses of any examiners who are out of town, all payable in advance, will be required.

VI. CANDIDATES FOR THE DEGREE OF MASTER OF ARTS

This degree is conferred upon candidates who comply with the following requirements:

1. The candidate shall have previously taken the degree of Bachelor of Arts, or have had a substantial

equivalent for the training implied by that degree, to be determined by special vote of the Faculty; but such degree or training must involve a good preparation for the work proposed for the Master's degree, in order that it may be accepted.

2. The candidate must devote a full academic year to post-graduate work in this University after receiving the Bachelor's degree or the training accepted as its equivalent. This work shall be mainly in one department, but the candidate may do also such other work as shall be advised by the head of his principal department, —whose approval of the whole course shall be necessary. In particular cases, the candidate may be allowed, by special vote of the Faculty, to divide his work between two years; but the aggregate must, in all cases, amount to a full year's work, at least.

3. The candidate must satisfy the representatives of his principal department that he has done his work faithfully and has mastered the subjects involved, by such written and oral examinations and other tests as the department may require. The head of the department shall make a written report to the Faculty of the grounds on which the candidate is recommended, specifying the amount and character of his work, and this report shall be filed in the office.

4. The candidate must present a thesis or written report on some topic included in his course or closely related to it, that shall receive the approval of the representatives of his principal department, be accepted by the Faculty, and filed in the office.

5. Every candidate recommended for the Master's degree shall pay a fee of ten dollars.

6. The Master's degree will be conferred at the annual commencement in June of any year on those candidates only who shall have made written application to be considered as such on or before January 15th preceding and shall have fulfilled all the conditions here specified at least one week before Commencement, at which time the academic year shall be regarded as ending for the purposes of section 2.

VII. SPECIAL STUDENTS NOT CANDIDATES FOR A DEGREE

Any one desiring to undertake a special and approved line of research, and whose attainments are such as to satisfy the requirements of the University, may also be received. This class includes persons who may desire to devote themselves exclusively to one or more of the special branches—mathematics, physics, chemistry, biology, anthropology, psychology, pedagogy, economics and sociology, or history,—but who do not care to matriculate or become candidates for a degree.

These students, provided they satisfy the heads of the departments of their training and competency in one subject, in which they must be advanced (although they may be less so, or even beginners, in other subjects), may be allowed entire freedom in their choice and combination of studies, and as special students may enjoy all the privileges of the University.

These students may, with the approval of the President, be received for less than an entire year.

VIII. PRELIMINARY CANDIDATES

Non-university students of less special or less advanced standing than the above classes, who contemplate becoming candidates for some higher degree, may also be received.

Students of this class must satisfy the authorities of the University of their attainments and that they contemplate advancing to a degree higher than that of A.B. The privileges and status of these students will be more fully defined later. They may, in exceptional cases, be elected to Scholarships.

Fellowships and Scholarships

From the George F. Hoar Fund of $100,000 provided by the generosity of Andrew Carnegie, the sum of $3,000 is now available for Junior and Senior Fellowships in the University. While the sums attached to these appointments are not fixed, a Senior Fellow may receive $200 together with the remission of fees; which makes the value of the appointment $300. A Junior Fellow may receive $100 with remission of fees, which makes the value of the appointment $200. Besides these, other appointments of Senior and Junior University Scholarships, with remission of fees, are made.

A citizen's fund

A citizen of Worcester has given a fund of $5,000, the income of which is to be used for the aid of "some one or more worthy native born citizens of the city of Worcester who may desire to avail themselves of the advantages of the institution."

THE FIELD FUND

Mrs. Eliza W. Field has also given $500 to be called the "John White Field Fund," the income of which is "to provide for the minor needs of a Scholar or Fellow."

The following regulations apply to the award of the income of the Field Fund:

1. Regard is had to the intellectual ability of the candidate as well as to need of pecuniary assistance.

2. Only candidates who have spent three months at the University are considered.

3. The head of each department will consider and report to the Faculty desirable cases in his department.

4. Applications are received not later than December 15th, and the awards made as soon as possible after the Christmas recess.

THE ELIZA D. DODGE FUND

Mrs. Dodge has given $1,000 to be known as the "Eliza D. Dodge Fund," the income only to be expended in aid of graduate students of limited means engaged in research work.

PURPOSE AND CONDITIONS OF FELLOWSHIPS AND SCHOLARSHIPS

Fellowships at Clark University are intended for young men and women of promise who desire to pursue post-graduate studies in order to fit themselves for intellectual careers. It is desirable, but not required, that candidates for these positions should intend to proceed to the degree of Doctor of Philosophy or to equivalent attainments. In general, those intending to devote themselves to some

special branch of learning are preferred to those directly fitting themselves for one of the three learned professions, although the latter are not excluded.

No application blanks are provided, but it is desired that the candidate should state fully and in writing his previous course of study and submit testimonials or diplomas, especially such as indicate a decided preference for some particular department. These should be accompanied also, if practicable, by some specimen of the candidate's work. Applications will be considered in May and in October and should be in the hands of the President on or before the first day of either month. In special cases vacancies may be filled by appointments at any time during the year. The names of unsuccessful candidates will not be made public.

Fellows must reside in Worcester during the entire academic year, devote themselves to special studies under the direction of their instructors, and give such evidence of progress or proficiency before the end of the year as the authorities shall require. It is generally expected that they will undertake some work of research during the year. They must coöperate in promoting harmony, order, and all the ends of the University, must not teach elsewhere, and may be reappointed at the end of the year. Being intended primarily as honors, both Fellowships and Scholarships are awarded without reference to pecuniary needs, so that those Fellows able and desiring to do so may relinquish the emolument and retain the title.

The paying fellowships will, for the present, be restricted to the departments of mathematics, physics, chemistry, biology, psychology, pedagogy, anthropology, and history.

Besides field work, excursions to institutions (public and private), coaching and cram classes, clubs, examinations, and other modes by which knowledge now seems best imparted and retained, the following educational methods are prominent:

Lectures. The Trustees desire that each instructor, of however few students, should prepare and deliver regular lecture courses, with diagrams, illustrative apparatus, and reference to standard text-books and the best current literature upon each topic. Advanced students are also encouraged to supplement the work of the professors by giving occasional special lectures and courses. Public lectures will be given from time to time.

Seminaries and Conferences. These are stated meetings for joint systematic work, under the personal direction of the professor, in some special part of his subject. Here students preparing theses and papers for publication in the journals edited at the University read them in incomplete form for mutual criticism and help. Here, also, the results of individual reading are reported for the benefit of all; views are freely criticised; new inquiries, methods, comparisons, standpoints, etc., suggested. From the mutual stimulus thus given many important works have proceeded and the efficiency of universities has been greatly increased.

Laboratory Work. For beginners this has been from the first the best of all forms of apprenticeship, bringing student and professor to a closer and mutually stimulating relation. Here the manipulation of apparatus is learned, processes are criticised, results obtained

by other investigators are tested, and methods discussed and perfected, with a view to developing that independence in research which is the consummation of scientific culture.

Notices

The charge for tuition, giving all the privileges of the University, but not covering the laboratory fees, is $100 per annum.

Board and lodging can be obtained near the University at very moderate rates.

Intending students will be given information, so far as possible, upon any of these or other points, in advance of official announcement, upon addressing the Clerk of the University, Miss Florence Chandler, Worcester, Mass.

All members of the University are expected to be present at the opening of each term and to continue in attendance to its close.

The following are the statements and announcements of the departments for the academic year, 1913–1914.

I. MATHEMATICS

Programme for 1913–1914

instruction in mathematics

The chief aim of the department is to make independent investigators of such students as have mathematical taste and ability; these naturally look forward to careers as teachers of the higher mathematics in colleges and universities, and we believe that the course of training best adapted to the development of investigators is also that which is most suitable for all who would be efficient college professors, even if they are not ambitious to engage in research. The first essential of success in either of these lines is the habit of mathematical thought, and the direct object of our instruction is the acquisition of this habit by each of our students. With this end in view, we expect every student to make himself familiar with the general methods and most salient results of a large number of different branches of mathematics, conversant with the detailed results and the literature of a few branches, and thorough master of at least one special topic to the extent of making a real contribution to our knowledge of that subject.

In accordance with these principles, the instruction is given by means of introductory, advanced and special courses of lectures, seminaries, and personal guidance in reading and investigation.

The introductory courses (mostly given in alternate years) treat the following subjects:

Analytic Geometry of Conics, Higher Plane Curves, Quadrics, Higher Surfaces, and Twisted Curves; 5 hours a week, through the year.

DIFFERENTIAL EQUATIONS, AND CALCULUS OF VARIATIONS; 5 hours a week, through the year.

THEORY OF FUNCTIONS OF REAL AND IMAGINARY VARIABLES, ELLIPTIC FUNCTIONS, AND DEFINITE INTEGRALS; 5 hours a week, through the year.

THEORY OF NUMBERS; 2 hours a week, one half-year.

MODERN SYNTHETIC GEOMETRY; 2 hours a week, one half-year.

ALGEBRAIC SUBSTITUTIONS AND THEIR APPLICATION TO THE THEORY OF EQUATIONS; 2 hours a week, one half-year.

ALGEBRAIC INVARIANTS; 2 hours a week, one half-year.

FINITE DIFFERENCES; 2 hours a week, one half-year.

It is expected that every student will take each course in the earliest year of his residence in which it is given, unless he has already completed an equivalent course elsewhere. The chief object of these courses is to make the student familiar with the various methods of mathematical research and the concepts of mathematical thought at the present day. Thus, for example, curves and surfaces are treated by modern methods from the beginning, with adequate consideration of the discoveries of the great geometers of recent times. The usual college courses in the theory of algebraic equations, analytic geometry, and the differential and integral calculus furnish all the necessary preparation for these introductory courses, although it is very desirable that the student be acquainted with the properties of determinants and their application to the solution of linear equations, and with the methods of solving differential equations of the simpler types. Deficiencies in these subjects may be made up by attendance on the corresponding courses in the Collegiate Department of the University.

Special advanced courses, open to all who are prepared for them, are given annually in subjects varying with the interests of the instructors and the needs of the students. These advanced courses are not repeated at regular intervals, but properly prepared students will receive the personal assistance of one or other of the instructors in reading any

subject not announced for the year in which they desire to take it.

The number and scope of the advanced courses given each year have been, thus far, regulated by the number of students qualified to profit by them and by the individual interests of the instructors; these courses will be increased, both in number and variety, whenever a real demand for such an increase shall make itself apparent. While the present purely scientific character of the University precludes instruction in strictly technical branches, we hope that the time is not far distant when the demand shall make it advisable, and increased facilities shall make it possible, to announce courses in Descriptive Geometry, Graphical Statics, Mathematical Astronomy, Vital Probabilities, and all the more important applications of mathematics to other sciences and to technical subjects. The applications of mathematics to physics already receive adequate consideration, and the further extension of such applications awaits only a demand for it on the part of students.

The subjects in which advanced courses may be expected to be given every few years include the following:

HISTORY OF MATHEMATICS.

ARITHMETIC: Numerical computations; Theory of numbers; Finite differences and the Calculus of operations; Probabilities and the Theory of errors.

ALGEBRA: Substitution-groups and the Galois theory of equations; Invariants; Quadratic forms; Simultaneous equations (including Restricted systems); Multiple algebra.

HIGHER ANALYSIS: Differential equations, ordinary and partial; Continuous groups; Definite integrals and Fourier's series.

THEORY OF FUNCTIONS: Functions of real and complex variables; Point-aggregates; Elliptic functions; Abelian integrals.

GEOMETRY: Modern synthetic geometry; Analytic geometry of higher plane curves, higher surfaces, and twisted curves; Rational and uniform transformations of curves and surfaces; Infinitesimal geometry; Analysis situs; Quaternions; Hyperspace and non-euclidean geometry.

SYMBOLIC LOGIC.

Other courses will be given whenever there is a demand for them, as in the past. The instructors are always glad to assist students in any line of mathematics that falls within the range of their own studies. The small number of students makes it possible to give personal attention to individuals, and the intimate and confidential relation thus established between pupil and teacher is an advantage that cannot be overestimated and ought not to be left out of account by the prospective student in determining where his studies shall be pursued.

For the academic year 1913–14, the following courses of lectures are announced:

BY PROFESSOR STORY

Introductory Course:

HIGHER ALGEBRA; 3 hours a week through the year.

Advanced Courses:

HYPERSPACE AND NONEUCLIDEAN GEOMETRY; 3 hours a week, through the year.

ALGEBRAIC INVARIANTS; 3 hours a week, first half-year.

INFINITESIMAL GEOMETRY; 3 hours a week, second half-year.

SEMINARY FOR ADVANCED STUDENTS; through the year.

BY PROFESSOR TABER

Introductory Course:

DIFFERENTIAL EQUATIONS AND CALCULUS OF VARIATIONS; 5 hours a week, through the year.

Advanced Courses:

STRUCTURE OF FINITE CONTINUOUS GROUPS; 2 hours a week, first half-year.

INTEGRAL EQUATIONS; 2 hours a week, second half-year.

SEMINARY; through the year.

BY PROFESSOR WEBSTER

[See announcement of Department of Physics, courses 10, 11, 13, 14.]

BY M. DE PEROTT

Introductory Course:

THEORY OF NUMBERS; 2 hours a week, first half-year.

Advanced Course:

ALGEBRAIC SUBSTITUTIONS AND THEIR APPLICATION TO THE THEORY OF EQUATIONS; 2 hours a week, second half-year.

BY DR. WILLIAMS

Introductory Course:

DETERMINANTS AND THE THEORY OF EQUATIONS; 2 hours a week, through the year.

While desirous of supplying all possible facilities to those who wish to pursue studies in special branches, and to those who, already occupying permanent positions, have but a limited leave of absence, we have made it our chief object to provide a thorough training for those who, having just completed a college course, have not yet entered upon their life-work. This provision consists of such courses of lectures, seminaries, and individual assistance as should enable a faithful student endowed with the proper natural ability to satisfy the requirements for the degree of Doctor of Philosophy at the end of his third year with us. The requirements for this degree have been determined by our conception of the ideal teacher, as already stated. To acquire the necessary breadth of knowledge of mathematics as a whole, the candidate is expected to attend, during his first two years, specified introductory courses of lectures on the general principles, methods, and results of all the more important branches of pure mathematics, to supplement these lectures by private reading and to take an active part in the seminary. In the seminary, a special topic more or less directly connected with the subject of some lecture, is assigned, from time to time, to each student, who is required to read it up and make an oral report

upon it before the class. Each candidate for the Doctor's degree is expected to attend a number of advanced courses. He spends the greater part of his third year in the original investigation, under the constant personal guidance of one of the instructors, of a topic of his own selection. In preparing for this investigation he is required to make a practically complete bibliography of the subject and to read all the more important available articles that have been written on it. The results of the investigation, embodied in a dissertation suitable for printing, must be submitted to the instructor under whose direction the work was done, and must receive his approval before the candidate will be admitted to the final examination for the degree. This approval will not be given unless the dissertation is satisfactory in form and completeness and the results are sufficiently novel and important to constitute a real contribution to science. The dissertation is, in fact, the main criterion by which the candidate is judged, and no amount of other work will compensate for its defects.

Each of the instructors is engaged in research and has always a number of investigations planned for himself, which have often been carried to a well advanced stage but are not completed for want of time. Such incomplete investigations are given to properly prepared candidates for the Doctor's degree, and they receive from the instructor all the assistance necessary for the completion of the work, thus becoming, to a certain extent, collaborateurs with the instructor.

The preparation of a bibliography of any topic is greatly facilitated by a classified index of mathematical literature on the card-catalogue plan, which has been prepared under the supervision of Professor Story and now includes nearly one hundred thousand titles of periodical articles, separate memoirs, and books in all fields of pure mathematics. This

index is much more complete than the Royal Society's catalogue, even in the restricted field of that catalogue (periodicals published between 1800 and 1900), and will be extended as rapidly as possible.

The ability of our graduates to carry on research and the excellence of the work actually done is assured by the regulation that each dissertation accepted by us as worthy of the degree shall be printed with the explicit approval of a member of our Faculty. It is evident that, whereas any one that has the necessary preparation and taste for mathematics may profit by the advantages here afforded, only those who have a certain amount of mathematical genius can secure the degree.

In making appointments to fellowships and scholarships we have endeavored to maintain the same high standard. We are on the lookout for mathematical geniuses; but it is difficult to determine from the evidence of others whether candidates come up to our standard or not; so that we have adopted the general policy of giving the best appointments to those only that have been with us for at least one year, and about whom we are in position to judge for ourselves. Of course, this policy could not be carried out during the earlier years of the University, and its effect is apparent in the fact that, whereas seventy-five per cent of the students that entered the mathematical department during the first three years remained with us but one year, only thirty-three per cent. of those that have been admitted from 1892 to the present time left at the end of their first year. We do not mean to imply that those who left before completing our course were inferior in ability to those who remained three years, but we desire particularly to encourage men who can and will go forward to the degree.

Nearly all of those who have studied mathematics with us have adopted teaching as a profession, sixty-eight per

cent are now members of college faculties, and thirteen per cent are engaged in higher school work. Those who have received the doctor's degree have generally secured at once desirable positions in which to begin their life-work, and most of them have already acquired for themselves, by distinguished ability, very decided influence in the institutions with which they are connected.

The degree of Master of Arts will be conferred upon students who complete with credit an approved course of one year and present a satisfactory thesis.

Every facility for the study of special branches will be given to properly prepared students who are not candidates for a degree, as also to those who, having already attained to the Doctor's degree (here or elsewhere), wish to continue mathematical study or investigation.

Material Facilities

The library is provided with the more important text-books, treatises, and memoirs on the various branches of mathematics, as well as the principal journals and transactions of learned societies that are devoted to any considerable extent to mathematics. A list of these journals will be found below.

The mathematical department possesses a good collection of models, a Thomas arithmometer, and an Amsler planimeter with revolving table.

List of Journals Relating to the Exact Sciences in the University Library

---

Amsterdam.

Koninklijke akademie van wetenschappen. Verhandelingen, 1854 to date. Complete.

Revue semestrielle des publications mathématiques. 1893 to date. Complete.

BALTIMORE.

American chemical journal. 1879 to date. Complete.

American journal of mathematics. 1878 to date. Complete.

BANGKOK.

Siam society. Journal. 1905-07.

BERLIN.

Berliner mathematische Gesellschaft. Sitzungsberichte. 1902 to date. Complete.

Chemisches Centralblatt. 1897 to date. Complete.

Deutsche chemische Gesellschaft. Berichte. 1868 to date. Complete.

Fortschritte der Physik. 1847 to date. Complete.

Jahrbuch über die Fortschritte der Mathematik. 1868 to date. Complete.

Journal für die reine und angewandte Mathematik. 1826 to date. Complete.

Königlich-preussische Akademie der Wissenschaften. Mathematische und naturwissenschaftliche Mittheilungen aus den Sitzungsberichten. 1882-97. Complete.

Zeitschrift für angewandte Chemie. 1888 to date. Complete.

BOLOGNA.

Istituto di. Bologna. Reale academia delle scienze.

Commentarii. 1731-1791. Complete.

Novi commentarii. 1834-1849.

Memorie fis. e mat. 1806-1910.

Memorie. 1850 to date. Complete.

Scientia; rivista di scienza. 1910 to date. Complete.

BOSTON.

American academy of arts and sciences. Proceedings. 1870 to date. Complete.

North American Review. 1815–1886.

Technology review. 1899 to date. Complete.

BOULDER, COLORADO.

University of Colorado. Studies. 1902 to date. Complete.

BRAUNSCHWEIG.

Deutsche physikalische Gesellschaft. Berichte. 1903 to date. Complete.

Jahresbericht über die Fortschritte der Chemie. 1847 to date. Complete.

BRESLAU.

Kaiserlich-Leopoldinisch-carolinische deutsche Akademie der Naturforscher. 1843.

BRUXELLES.

Académie royale des sciences des lettres et des beaux-arts de Belgique.

Bulletins. Ser. 3. 1889 to date.

Mémoires couronnés et mémories des savants étrangers. 1889-90.

CAMBRIDGE, ENGLAND.

Cambridge philosophical society.

Proceedings. 1843 to date. Complete.

Transactions. 1822 to date. Complete.

CAMBRIDGE, MASSACHUSETTS.

Science. 1883 to date. Complete.

CHARLOTTESVILLE, VIRGINIA.

Annals of mathematics. 1884 to date. Complete.

CHICAGO.

Astrophysical journal. 1895 to date. Complete.

Terrestrial magnetism. 1896 to date. Complete.

COLUMBIA, MISSOURI.

University of Missouri studies. Science series. vol. 1. 1905-07.

DRESDEN.

Zeitschrift für Chemie und Industrie der Kolloide. 1906 to date. Complete

EASTON, PENNSYLVANIA.

American chemical society.

Chemical abstracts. 1907 to date. Complete.

Journal. 1879 to date. Complete.

Proceedings. 1878 to date. Complete.

EDINBURGH.

Edinburgh mathematical society. Proceedings. 1884-1907.

Edinburgh philosophical journal. 1819-1826.

Edinburgh royal society transactions. 1873 to date. Complete.

GÖTTINGEN.

Königliche Gesellschaft der Wissenschaften. Nachrichten von der k. Gesellschaft der Wissenschaften und der Georg-Augusts-universität. 1853 to date.

GREIFSWALD.

Archiv der Mathematik und Physik. 1901 to date.

HAARLEM.

Hollandsche maatschappij der wetenschappen. Archives néerlandaises des science exactes et naturelles. 1866 to date. Complete.

HALIFAX.

Nova Scotian institute of science.

Proceedings and transactions. Halifax. 1890 to date. Complete.

HALLE.

Zeitschrift für Electrochemie. 1895 to date. Complete.

HAMBURG.

Mathematische Gesellschaft. Mittheilungen. 1890 to date. Complete.

Zeitschrift für anorganische Chemie. 1892 to date. Complete.

HEIDELBERG.

Annalen der Chemie. 1832 to date. Complete.

INDIANAPOLIS.

Indiana academy of science. Proceedings. 1895-98.

ITHACA.

Journal of physical chemistry. 1896 to date. Complete.

LAWRENCE, KANSAS.

Kansas University science bulletin. 1902-1908.

LEIPZIG.

Acta Eruditorum, 1682-1731. 50 vols. Supplementa, 1692-1734. 10 vols. Indices generales, 1693-1733. 10 vols. in 5.

Nova Acta Eruditorum, 1732-1782. 13 vols. Supplementa, 1735-1739. 3 vols. in 2.

Annalen der Physik. 1824 to date. Beiblätter, 1889 to date. Complete.

Archiv für Optik. vol. 1. 1908.

Chemische Novitäten. 1905-08.

Deutsche Mathematiker-vereinigung. Jahresbericht. 1890 to date. Complete.

Encyklopädie der mathematischen Wissenschaften mit Einschluss ihrer Anwendungen.

Fortschritte der Chemie, Physik und physikalischen Chemie. 1909.

Internationale Mathematiker-congresse. Verhandlungen. 1897 to date. Complete.

Jahrbuch der drahtlosen Telegraphie und Telephonie. 1908 to date. Complete.

Jahresbericht über die Leistungen der chemischen Technologie. 1856 to date. Complete.

LEIPZIG (Continued).

Journal für praktische Chemie. 1834 to date. Complete.

Königlich-sächsische Gesellschaft der Wissenschaften.

Berichte über die Verhandlungen der mathematisch-physischen Classe. 1849 to date. Complete.

Abhandlungen der mathematisch-physischen Classe. 1852 to date. Complete.

Mathematische Annalen. 1869 to date. Complete.

Zeitschrift für Chemie. 1866-71.

Zeitschrift für Mathematik und Physik. 1856 to date. Complete.

Zeitschrift für physikalische Chemie. 1887 to date. Complete.

Zeitschrift für mathematische und naturwissenschaftliche Unterricht. 1903 to date.

LIÈGE.

Société royale des sciences. Mémoires. 1843 to date. Complete.

LONDON.

British academy. Proceedings. 1905. 1907.

British association for the advancement of science. Reports. 1831 to date. Complete.

Chemical news and journal of physical science. 1904 to date. Complete.

Chemical society of London.

Annual reports on the progress of chemistry. 1905 to date. Complete.

Journal. 1849 to date. Complete.

Electrician. 1891 to date. Complete.

International catalogue of scientific literature. 1902 to date. Complete.

London mathematical society. Proceedings. 1865 to date. Complete.

Royal Society.

Proceedings. 1800 to date. Complete.

Philosophical transactions. 1665 to date. Complete.

Nature. 1870 to date. Complete.

Nineteenth century. 1877 to date. Complete.

Philosophical magazine. 1798 to date. Complete.

Quarterly journal of pure and applied mathematics. 1857 to date. Complete.

Quarterly review. 1809-1885.

Science abstracts. 1898 to date. Complete.

Science progress in the 20th century. 1907 to date. Complete.

MADISON.

Wisconsin academy of arts and sciences. Transactions. 1898.

MANILA.

Philippine journal of science. 1906 to date. Complete.

MILANO.

Annali di matematica, pura ed applicata. 1889 to date.

Reale istituto lombardo di scienze e lettere. Classe di scienze mathematieech naturali.

Rendiconti. 1864-67. Complete.

Rendiconti. 1868 to date. Complete.

Memorie. 1843 to date. Complete.

MONTREAL.

Royal society of Canada. Proceedings and transactions. 1882-1906.

NEW HAVEN.

American journal of science and arts. 1871 to date. Complete.

NEW YORK.

American mathematical society.

Annual register. 1892 to date. Complete.

Bulletin. 1894 to date. Complete.

Transactions. 1900 to date. Complete.

American society of biological chemists. Proceedings. 1907 to date. Complete.

Appleton's journal of literature, science and art. 1869-76.

Electrical world and engineer. 1907 to date. Complete.

Journal of biological chemistry. 1905 to date. Complete.

The Minerva. 1824-26.

New York Mathematical Society. Bulletin. 1891-94. Complete.

Popular science monthly. 1872 to date. Complete.

Physical review. 1894 to date. Complete.

OXFORD.

Messenger of mathematics. 1862 to date. Complete.

PALERMO.

Circolo matematico di Palermo. Rendiconti. 1887 to date. Complete.

PARIS.

Annales de Chemie et de physique. 1789-1908.

Annales scientifiques de l'École normale supérieure. 1864 to date. Complete.

Association française pour l'advancement des Sciences. Comptes rendus des sessions. 1873 to date. Complete.

Bulletin des sciences mathématiques. 1870 to date. Complete.

Bureau international des poids et mesures 1881. to date. Complete.

École polytechnique. Journal. 1794 to date. Complete.

Institut de France. Académie des sciences. Comptes rendus hebdomadaires des séances. 1835 to date. Complete.

Journal de mathématiques pures et appliquées. 1836 to date. Complete.

L'éclairage électrique. 1894-1907.

Nouvelles annales de mathématiques. 1842 to date. Complete.

Revue des deux mondes. 1908 to date. Complete.

Revue générale des sciences pures et appliquées. 1903 to date. Complete.

Revue scientifique. 1863 to date. Complete.

Société chimique de Paris. Bulletin. 1858 to date. Complete

Société mathématique de France. Bulletin. 1873 to date. Complete.

ST. PETERSBURG.

Journal of physical chemistry. (Russian Text.) Chemical section and physical section. 1909 to date.

PHILADELPHIA.

Academy of natural sciences of Philadelphia. Proceedings. 1890 to date. Complete.

American electrochemical society. Transactions. 1902-1910. Complete.

Lippincott's magazine of literature, science and education. 1868-1881.

PISA.

Il Nuovo Cimento. 1891 to date. Complete.

ROME.

Reale accademia dei lincei. Atti. Rendiconti. etc. 1847 to date.

SACRAMENTO.

Lick observatory. Publications. 1887-1903.

SALEM, MASSACHUSETTS.

American Association for the advancement of science. Proceedings. 1848 to date. Complete.

SIDNEY.

Australasian association for the advancement of science. 1888 to date. Complete.

STOCKHOLM.

Acta mathematica. 1882 to date. Complete.

Bibliotheca mathematica. 1884 to date. Complete.

STRASSBURG.

Zeitschrift für physiologische Chemie. 1877 to date. Complete.

STUTTGART.

Jarhbuch der organischen Chemie. 1908. to date. Complete.

Sammlung Chemischer und chemisch-technischer Vorträge. 1896 to date. Complete.

TOKYO.

Journal of the College of Science of the Imperial University of Japan.

Mathematico-physical society. Proceedings (Tôkyô sûgakubuturigakkwai kizi). 2nd Ser. 1901 to date. Complete.

TOULOUSE.

Université de Toulouse. Faculté des sciences. Annales. 1887 to date. Complete.

URBANA, ILLINOIS.

University of Illinois. University studies. 1900-1908.

WASHINGTON, D. C.

National academy of sciences.

Biographical memoirs. 1877 to date. Complete.

Memoirs. 1883-1902.

Reports. 1883 to date. Complete.

U. S. Bureau of Standards. Bulletin. 1905 to date. Complete.

U. S. Naval observatory. Publications 1900-1903.

U. S. Naval observatory. Astronomical and meteorological observations. 1885-89.

WIESBADEN.

Zeitschrift für analytische Chemie. 1862 to date. Complete.

WIEN.

Kaiserliche Akademie der Wissenschaften.

Denkschirften; mathematisch-naturwissenschaftliche Classe. 1850-1908.

Sitzungsberichte der mathematisch-naturwissenschaftlichen Classe. 1848 to date. Complete.

Monatshefte für Mathematik u. Physik. 1908.

Monatshefte für Chemie und verwandte Theile anderer Wissenschaften. 1881 to date. Complete.

WORCESTER.

The Mathematical review. 1896-97.

II. PHYSICS

The Department of Physics of Clark University is exclusively a department for graduate study and research in pure and applied physics. In order to set forth to the intending student the facilities of this department, stress may be laid on a number of points in which it is believed that the conditions here are exceptional.

First, the fact that the attention of the professor is not distracted from the needs of the student by other duties, which, combined with the small number of students in the department enables an amount of personal attention to be given to each one which is perhaps unique in this country. The head of the department is able to see each student and to give him personal advice in the conduct of his researches or his studies every day if necessary. The facilities without which no graduate department of research in physics can be complete are comprised under three heads: first, a systematic course of lectures in theoretical or mathematical physics; second, a laboratory with a sufficient number of rooms for individual work and with a sufficient equipment of apparatus and an instrument shop for the speedy production of whatever may be necessary for the research in hand; third, a library containing the classic works on physics, with full sets of journals and proceedings of learned societies by which the history of progress, past and present, may be studied, and kept up-to-date by the continual purchase of the latest works. In all these directions the facilities offered by this department invite attention.

The lecture courses are so arranged as to cover in a cycle

of two years all the principal subjects and methods of theoretical physics. The pursuit of them will fit the student to read and study with facility any memoirs on mathematical physics. The courses are so arranged that, although they follow in order, it is possible for a student to begin in either year of the cycle. The regular courses are those not marked with a star, and constitute a course of from five to seven hours weekly. The starred courses are delivered at irregular intervals, according to the demands or the presence of students of sufficient advancement.

LECTURES

1. Dynamics. General Principles, Equations of Lagrange and Hamilton, Methods of Hamilton and Jacobi, Systems of Particles, Rigid Bodies.

This course is fundamental for the pursuit of all the others, and includes a detailed account of the principle of Least Action and the differential equations of Lagrange, preparatory to their application to other parts of mathematical physics such as optics and electricity.

2. Newtonian and Logarithmic Potential Functions, Attraction of Ellipsoids.

This course is a necessary preliminary to the study of electricity and magnetism, of hydrodynamics, and of the figure of the earth.

3. Elasticity, Hydrodynamics, Wave and Vortex Motion, Dynamical Basis of Sound and Light.

This course is the basis of applications of the theory of wave motion to sound, light, electro-magnetism, and earthquake waves, and to the study of meteorology.

3a. * Dynamics of Cyclic and Oscillatory Systems, with Applications to the Theory of Electricity, Sound and Light.

The substance of the preceding courses is contained in Professor Webster's Treatise on Dynamics, B. G. Teubner, Leipzig.

3b. * The Theory of Resonance with Applications to the Measurement of Sound and to Wireless Telegraphy.

This course takes up Professor Webster's original researches in acoustics, and also shows how the methods there employed bear on the fundamental electrical phenomena involved in wireless telegraphy.

4. Electricity and Magnetism. The Classical Theories and the Theory of Maxwell, with an account of the principal methods for the solution of problems and applications to absolute measurements.

The substance of this course is found in Professor Webster's Mathematical Treatise on the Theory of Electricity and Magnetism, London, Macmillan & Co.

4a. * Recent Developments in Electrical Theory, including the Theory of Lorentz and the Principle of Relativity.

The application to the theory of electrons and to the optics of bodies in motion.

5. The Theory of Light. Propagation of Light, Diffraction, Reflection and Refraction, Dispersion, Double Refraction, Polarization, Metallic Reflection, Magneto-optics.

5a. * Comparison of Theories of the Ether.

Critical and historical examination of the various mechanical explanations of the luminiferous ether, including those of Green, McCullagh, Kelvin, Maxwell, Sommerfeld and Larmor.

5b. * Geometrical Optics. Properties of Systems of Rays, and their Various Aberrations. Hamilton's Characteristic Function or Eikonal. Applications to Optical Instruments.

6. Thermodynamics. Thermo- and Electro-Chemistry.

The establishment of the two laws of thermodynamics, and their application, by means of the methods of Gibbs and Helmholtz, to the examination of physical and chemical phenomena. Application to heat-engines, including steam, gas, and oil engines, the flow of gases and vapors, and the steam turbine. The conditions of chemical equilibrium, phenomena of electrolysis, osmotic pressure, and capillarity.

7. The Kinetic Theory of Gases. The Maxwell-Boltzmann Theorem and the Elements of Statistical Mechanics.

8. * The Theory of Radiation and of a Black Body.

The relations obtained from the laws of Kirchhoff, Stefan, Wien, and Planck, by the recent applications of thermodynamics.

9. * The Phenomena of Conduction of Electricity in Gases, and of Radioactivity, and their Bearing on the Structure of the Atom.

10. The Partial Differential Equations of Mathematical Physics.

Laplace's Equation, Equation of Thermal and Electrical Conduction, Equation of Wave-motion, Helmholtz's Equation, Lorenz-Beltrami Equation, Telegrapher's Equation, and their special cases; methods of

Cauchy, Green and Riemann; Normal functions, Developments in Series, Fourier's Series, Legendre's, Laplace's, Bessel's and Lamé's functions.

This course is one of the most important for the physicist, and treats a great variety of subjects from the most varied fields, grouping them all into a connected system, and embracing all the methods of theoretical physics.

11. * The Elements of Integral Equations, and their application to Mathematical Physics.

12. * Selected Chapters in the Application of Theoretical Physics to Cosmical Phenomena. including Problems in Geodesy, the Tides, Meteorology, Seismology, and Terrestrial Magnetism.

13. * Linear Differential Equations.

The applications of the theory of functions to the linear differential equations of the second order which arise in mathematical physics.

14. * Orthogonal Surfaces and Curvilinear Coördinates and their Applications.

The courses for 1913-14 will be 5, 5a, 6, 7, 10, 11.

In addition to the above formal courses there is held a weekly Colloquium, or meeting for the informal discussion of subjects not treated in the lectures, and for the presentation by the students of reports on important articles appearing in the journals. A part of the work of the colloquium consists in the systematic presentation of certain classical researches, more or less connected with the lectures, in preparing which the students make use of the original sources of information, thus gaining much acquaintance with the methods of the masters in research. The work of the colloquium has an excellent effect in training students to present their ideas in a systematic manner before an auditory.

Among the various lines of investigation now attracting the attention of the physicists the following are preëminent in importance. First, the interrelations between the luminiferous ether and ordinary matter, and the modifications necessary to be made in Maxwell's theory in order to explain the known optical and electrical phenomena of bodies in motion, and that aspect of the theory which deals with the properties of the small electric bodies known as electrons. This portion of mathematical physics is extremely new, and has hardly begun to appear in university courses in this country. Second, the structure of the atoms of matter, to which the subjects of

spectroscopy and the new and fascinating field of radio-activity give the most promising clew. Third, the thermodynamics of radiation in general, which is most intimately connected with the first, and about which a similar remark may be made as to the lack of instruction.

Of branches of applied physics now awaiting the attention of the mathematical physicist may be mentioned meteorology, seismology, and geophysics in general, in all of which the accumulation of experimental data is ahead of the development of theory, to such an extent in meteorology that Professor Arthur Schuster has said that it would be advisable to suspend all meteorological observations for the next ten years, until the theory should have in some degree caught up with the mass of information already accumulated. The theory of meteorology depends on complicated applications of hydrodynamics and thermodynamics; so as to make great demands upon the mathematical physicist, but the field is a rich one to him possessed of the skill to cultivate it. The study of earthquake phenomena is one that is now becoming of great importance in this country, while the investigation of terrestrial magnetism has lately made great advances.

It is almost obvious to the trained investigator that no one can expect to become a physicist of the first rank without a thorough training in mathematical physics, as without that the results of experiment will never be collected into a coherent system worthy the name of an exact science. Furthermore all mathematical physics must rest upon mechanics, the principles of which are of an importance transcending that of any other branch of natural science. It is for this reason that the courses in physics in this department begin with mechanics, and are developed progressively in a systematic manner. They have the advantage of having been deliberately planned for the needs of students of pure physics, as experience has shown them to be prepared by the various colleges, and of

being all delivered by the same person, so that logical consistency and continuity of method are assured. The waste of time often incurred by repetitions of the same subject and of changes of notation by various instructors is thus totally avoided. Attention is called to the fact that no branch of physics is left unprovided for in the course of lectures.

The aim of the department is to insure in its students some acquaintance with all the various fields of experimental physics, to develop in them the power of exact measurement, to accustom them to exact reasoning from experiment to theory, and to encourage original research conducted on a sound basis. To this end students will be put to work in the laboratory upon experiments of sufficient difficulty to give them skill in measurements of precision, and to enable them to become familiar with the precautions and corrections necessary to be employed in exact work. After a sufficient amount of experience has been gained, and the student has shown himself to be possessed of sufficient originality to warrant independent investigation, he will be encouraged to take up for himself an original research in the hope of making a personal contribution to science. In this research he will have at all times the benefit of the direction and advice of the professor.

It should be urged upon intending students to prepare themselves, not only in ordinary laboratory measurements, but also in mathematics, the lack of proper mathematical preparation being a serious drawback to the appreciation of the lectures. In particular may be recommended for study not merely those portions of the calculus which deal with the working out of many indefinite integrals, etc., but the theoretical portions which deal with the ideas of partial derivatives, definite integrals, and their practical manipulation, together with enough analytic geometry to involve the properties of lines and *surfaces* of the second order, and a fair amount of the elements of determinants. As suitable text-

books for preparation may be recommended to the student Lamb's, Osgood's or Gibson's Calculus, C. Smith's Analytical Geometries, and Muir's or Hanus's Determinants. Appell, *Eléments de l'analyse mathématique* may be very strongly recommended to the intending student for study before and during his course at the University.

It cannot be too strongly urged that the student should, from the beginning, be able to read French and German with ease and to make use of works in them.

REQUIREMENTS FOR THE DOCTOR'S DEGREE

1. The ability to read at sight specimens of scientific French and German, tested before the first of November preceding the Doctor's examination by a committee of two members of the Faculty.

2. The successful passing of an examination upon the general subject of Experimental Physics[1] and upon the subjects named above in the regular course in Theoretical Physics, as a major requirement, together with an examination in one minor subject, *to be determined in each particular case by the head of the Physical Department.* This subject will be Mathematics or Chemistry.

3. The presentation of a satisfactory dissertation, involving a substantial amount of original work, and forming a contribution of value to pure science. The presentation of the dissertation is a prequisite to examination. The time of residence necessary for the proper fulfilment of the above requirements will generally be at least three years, of which at least one will be very largely devoted to work on the dissertation. Students will not be encouraged to enter upon the work of a dissertation until they have acquired sufficient experience to enable them to specialize with advantage.

The aim of the department is to produce physicists rather than electricians, acousticians, opticians, engineers, or narrow specialists of any sort, for although in the nature of things one will be obliged to know more of one subject than of others, yet it seems evident that no thorough knowledge of any branch can be gained without a comprehensive view over the whole subject. Without this the specialist, or the experimentalist lack-

[1] Every student is recommended to provide himself with Winkelmann's *Handbuch der Physik* as a work for continual reference.

ing a knowledge of mathematics, will continually be falling into pitfalls which the more wary avoid. Furthermore it can be but a detriment to science to encourage research in new fields by immature and ill-prepared minds and hands.

The following statement is here inserted for the benefit of students of mathematics.

The minor in Mathematical Physics consists of the subject-matter of courses 1, 2, 3, and 10, which are intended to constitute the equivalent of five hours a week for one year. Course 10 is given in alternate years to the other courses. The subject-matter of the course is contained in Dr. Webster's treatise on *Dynamics* and his work on Partial Differential Equations, now in press.

THE LABORATORY

The laboratory occupies three floors of one wing of a large well lighted building free from disturbances, and admirably adapted to the purposes of a physical laboratory. On the ground floor is a room extending across the end of the building forty-five feet long by twenty-two feet wide, with windows on three sides, above which are three similar rooms. A lift running from the bottom to the top floor affords means of transporting apparatus, while its shaft furnishes space for manometer or barometer tubes. In the lower room are four piers with heavy stone tops, and two others below the floor on which can be placed heavy tables.

Also on the ground floor is a large dark room, partially below ground, in which the temperature is tolerably constant, containing a very large and heavy pier. The engine and storage-battery room contains a kerosene engine and dynamo on the same foundation and sixty storage cells of ten amperes capacity, constituting the power-supply. The engine may be started at a few moments notice, even at night, but has

been superseded for most purposes by a motor-generator which is driven by an external supply and furnishes all needed direct current. The storage cells are conveniently arranged so that each one is accessible from each side, from above and below, and the ventilation is excellent, while the room is as light and clean as the work-rooms. Distributing switchboards allow the current from the dynamo or any section of the battery to be supplied to any of the rooms. On the same floor are three rooms constituting the workshop, one of the most important parts of a research department of physics. The first room is devoted to wood-working and pattern-making, and accommodates also a bench for soldering. The next room contains the machinist's bench, two engine-lathes and planer, and the third room a Rivet precision bench-lathe, jeweller's lathe and drill-press. There is no countershafting in the building, each tool being driven by a separate electric motor, so that perfect quiet and steadiness are ensured. In the shop are executed all repairs and alterations of apparatus, and the new apparatus requiring continual experiment is constructed. Most of the principal pieces of apparatus belonging to this department have been thus constructed. In this manner, by having a mechanic always present, an extremely great economy in time and money is effected, and vexatious delays, which would otherwise completely arrest the progress of the work, are avoided. Facilities and encouragement are given to the students to construct apparatus for themselves.

On the main floor are the lecture room, the director's office, the large room used as the director's private laboratory and apparatus room, and three other convenient rooms for research. Two of these are arranged so that they may be darkened for photography, and are also fitted with chemical hoods. The large room on the top floor is diagonally di-

vided into two, one dark and devoted to the Rowland twenty-foot diffraction grating, and with a photographic dark room attached. The second is utilized for work in sound. Every room in the laboratory contains sinks, gas and electric light connections, and several circuits connecting with the switch-board in the battery-room.

The laboratory is well equipped with apparatus for research, besides having the facilities above described for the construction of instruments of any sort needed for that purpose. In addition may be mentioned a large collection of diagrams illustrative of mathematical physics, many of them being originals of the figures in Professor Webster's "Electricity and Magnetism" and "Dynamics," and a number of interesting models used in teaching dynamics, thermodynamics, and electricity. Among them are Maxwell's Dynamical Top and a number of other interesting tops, Maxwell's and Rayleigh's induction models, Gibbs's, van der Waals's and other thermodynamical surfaces. This collection of drawings and models can probably not be matched in this country, and is continually being increased.

The laboratory affords so much space that it is rarely necessary to put more than one student in a single room. Every student receives personal attention in the laboratory from the professor whenever he needs it, and is continually in receipt of instruction and suggestion by personal contact, the best form in which information can be imparted. Emphasis should be laid on the advantage to the research student of the contact with a professor who has no other duties or interests than the furtherance of research, in an institution devoted to this as its main object.

THE LIBRARY

In the library Clark University has one of its strongest features. With a large separate building, administered in

the most liberal manner with a view to the advantage of the research student, and with ample funds for the purchase of books, its facilities in the Department of Physics can hardly be surpassed. It may be said to contain all of the most important works in many languages, and is continually kept up to date, any book wanted needing only to be mentioned to be procured. The library is particularly rich in journals, among which are included the transactions of the learned societies of England, France, Germany, Italy, Austria, Holland, and Belgium. Other sets are being continually added. A list of journals will be found on pages 50–55. There are few subjects connected with physics which may not be thoroughly studied in this library.

III. CHEMISTRY

Within the past few decades chemistry has been gradually passing from the larval state of a descriptive science into a higher state of development, the theoretical state. This transition has given to the ancient science, not only a new beauty and usefulness, but also an amazing *will to grow.*

Some liken the new chemistry to a tower in the earliest stages of construction, with a host of men swarming on the scaffolding, engaged in adding stone after stone to the promising structure.

From the pure science this intense constructive activity has spread, as might be expected, to the applied branches, notably the American chemical industries. Where twenty-five years ago the chemist was employed, and allowed, to do nothing but routine testing, to-day research laboratories are in active operation, whose members are expected to invent, develop, or improve something somewhere in the processes of manufacture. American enterprise has discovered a way toward the highest utilization of the country's wealth in setting trained ingenuity at work in chemical research laboratories.

The equipment of the industrial chemist, as well as of the competent teacher, must consequently consist, not so much in a memorized collection of formulae and processes, or of heterogeneous information in the chemistry of the manufactures, as in a clear critical understanding of the principles of pure chemical science and in some experience in grappling with difficulties. The desire for *such* knowledge, and the courage and perseverance necessary in attacking problems,

are acquired only through research. And hence *a department of chemistry, particularly a graduate department, must be primarily a department of chemical research.*

With this principle in view, the activities of all members of this Department, both instructors and students, are devoted mainly, almost entirely, to research. The number of lectures is reduced to a reasonable minimum. Students take up research from the first day of their residence in the Department, and are directed to devote about one-quarter of their time to all scholastic work combined, and the remaining three-quarters to research. The investigations in which they are expected to engage are, as a rule, extensive in scope and occupy two years at least, in some cases three years or more. This makes it possible for the student to found his Doctor's degree, not on a perfunctory dissertation, but on a study and contribution that will give him scientific confidence for years to come.

Even the lecture courses, instead of forming descriptive presentations of existing chemical knowledge, are conducted, as far as possible, on a research plan. In the first place, the material of the lectures is derived, not from text-books, but from the original literature, and the student is constantly referred to original communications for accessory study. Then, each topic is approached by the lecturer, not as a chapter in a book, but as a problem in nature. The topic is introduced by an estimate of its importance and of its bearing on other problems. This is followed by an account, on the historical plan as far as possible, of the extent to which the problem has been solved, of how this was done, and of how much is not yet solved, with suggestions as to practical methods by which solution might be obtained. It is believed that such *critical mode* of study is the true characteristic of university work; perhaps the only characteristic that can keep university lectures from forming a continuance

of the teaching of the lower schools, which often permanently impairs the student's most precious possession: his inherited creative instinct.

Specialized courses are offered on topics of history of chemistry, chemical dynamics, heterogeneous equilibria, organic synthesis, stereo-chemistry, electro- and thermo-chemistry, applications of thermodynamics to chemistry, etc., and the student is expected to attend them regularly. To aid students not quite prepared for work of this kind, simpler lecture and laboratory courses will be offered in general inorganic chemistry, organic synthesis and analysis, physical chemistry, etc.

Part of the scholastic work of the Department consists in Colloquium exercises, students and instructors alike presenting accounts of current chemical research or, at times, delivering formal lectures on classical achievements of the past, or on the life and life-work of celebrated masters of chemical research.

Finally, several times in course of the academic year (but not oftener than once a month) lectures will be delivered here by active chemical investigators from other institutions—lectures dealing generally with the aims and methods of their own investigations. The Department expects much stimulus from such occasional contact with brilliant and hopeful scientific men.

The research work conducted in the Department runs mainly along the following lines: 1. Experimental and theoretical study of the deviations of fact from accepted principles of *general chemistry;* 2. Experimental study of organic substances and reactions from the standpoint of chemical statics and dynamics: *physico-organic chemistry.* Of course, promising investigations may be taken up, from time to time, along other lines as well.

Instead of more or less insignificant pieces of work being

"assigned" to students for their first experience in research, they will be made, if they desire it, *collaborators* of their professor in his own investigations (unless, indeed, they bring forward practicable research projects of their own). Nothing could more certainly assure constant and intimate contact between professor and student and the student's really receiving the best that the Department can offer: individual guidance.

REQUIREMENTS FOR THE DOCTOR'S DEGREE

Strictly speaking, there are no formal "requirements" for the Doctor's degree in this Department. The general University Faculty expects in all cases one year's residence. Otherwise the Department is entirely autonomous in its organization of the training for the degree and in its final estimate of the candidate's maturity. *This imposes upon both instructors and students the duty of zealously guarding the honor of the degree and of maintaining in the Department the highest attainable intellectual standard.*

The time necessary to qualify for the degree of Doctor of Philosophy will depend in each case partly upon the ability of the student, but mainly upon the exigencies of his investigation. Three years will not be too long in most cases.

If the student does not possess, at the time of his joining the Department, a good reading knowledge of both German and French and a working knowledge of analytical geometry and the calculus, he ought to acquire such knowledge as early as possible. Experience shows that students learn a considerable amount of mathematics through the special course in chemical mathematics offered here, and also through the courses in physical chemistry. The Colloquium work invariably leads to improvement of the student's knowledge of languages.

The student is advised and expected not to neglect any one of the great branches of modern chemistry by "majoring" in one of them and "merely minoring" in the others.

The examinations for the degree will consist, on the one hand, in a series of partial tests distributed throughout the candidate's period of residence and, on the other hand, in a general final examination in the several branches of chemical science, including organic and physical chemistry, and chemical statics and dynamics; also in one minor subject *to be determined in each case by the Head of the Chemical Department.*

But the real basis upon which the degree will be conferred will be a dissertation forming, in the opinion of the Head of the Department, a genuine contribution, either purely theoretical or experimental, to chemical science.

If a candidate shall have shown in his research signs of true originality of thought, the Doctor's degree will be conferred upon him *cum laude.*

THE MASTER'S DEGREE

The University does not require an original scientific contribution in connection with the Master's degree. In this Department an applicant is, accordingly, offered free choice between founding his degree on research or on purely scholastic work. It is a pleasure to record that as yet applicants have invariably chosen the former, in spite of being warned that research is uncertain of outcome and more difficult, and might prolong to two years the time necessary for the attainment of the degree.

In the scholastic exercises no qualitative distinction is made between work for the Master's and that for the Doctor's degree in chemistry. The former degree is considered a stepping-stone to the latter.

1. STOICHIOMETRY, Mondays and Wednesdays, throughout the year. Dr. Rosanoff.

2. ORGANIC STEREO-CHEMISTRY, Tuesdays, throughout the year. Dr. Rosanoff.

3. HIGHER MATHEMATICS FOR STUDENTS OF CHEMISTRY, Tuesdays, Wednesdays, and Fridays, throughout the year. Dr. Story.

4. COLLOQUIUM, Tuesdays, at 4 p.m. Once a week during one part of the year, twice a week during another part.

ONE CANDIDATE'S EQUIPMENT

In order to give anyone who may be interested some insight into the actual working and results of the arrangements made in the Department, it seemed desirable to make a statement as to the work here of one student, recently graduated:

I. Research

The candidate began his research, dealing with the cause of the relative velocities of certain organic reactions, in October, 1908, and continued the study until August, 1911. The work consisted in precise measurements of reaction velocities, combined with other physico-chemical measurements and preparative organic work. It gave the candidate no little insight into the methods of chemical kinetics and statics.

II. Courses Taken

First Year:

1. The hydro-aromatic series, including the monocyclic and polycyclic terpene bodies (Dr. Rosanoff).
2. Organic stereo-chemistry (Dr. Rosanoff).
3. Special methods of inorganic analysis (Dr. Merigold).
4. Organic synthesis (Dr. Rosanoff).
5. Chemical mathematics (Dr. Story).

Second Year:

6. General and physical chemistry, especially gases, liquids, and solutions (Dr. Rosanoff).

7. Dyestuffs, alkaloids, and polypeptides (Dr. Clark).

8. Inorganic stereo-chemistry; radio-activity (Dr. Merigold).

9. Thermodynamics, with some emphasis on applications to chemistry (Dr. Webster).

10. Supplementary and explanatory course in thermodynamics (Dr. Hubbard).

During his second year the candidate also acted as teaching assistant in organic synthesis in the Collegiate Department (one afternoon a week).

Third Year:

11. The law of mass action in homogeneous systems (Dr. Rosanoff).

12. The phase rule and the law of mass action in heterogeneous systems (Dr. Rosanoff).

13. Constitution of derivatives of benzene, naphthalene, anthracene, etc. (Dr. Clark).

14. Methods of atomic weight determinations (Dr. Merigold).

During the third year the candidate also attended for the second time Dr. Rosanoff's lectures on organic stereo-chemistry and spent a small fraction of his time as Research Assistant in the University Department.

III. Partial List of Papers Reported by the Candidate in Colloquium

1. Jean Rey. "The Increase in Weight of Tin and Lead on Calcination." (Alembic Club Reprints.)

2. Mayow. "Medico-Physical Works." (Alembic Club Reprints.)

3. Priestley. "The Discovery of Oxygen." (Alembic Club Reprints.)

4. Scheele. "The Discovery of Oxygen." (Alembic Club Reprints.)

5. Ipatieff (pyrogenetic researches), *Berichte*, *34*, 596 (1901).

6. Ipatieff (same subject), ibid., 3579 (1901).

7. Ipatieff (same subject), ibid. *35*, 1047 (1902).

8. Perkin and Pickles (synthesis of terpenes), Trans. London Chem. Soc., *87*, 639 (1905).

9. Perkin and Matsubara (same subject), ibid., *87*, 661 (1905).

10. Baeyer (terpenones of the carvone group), *Berichte*, *27*, 1916 (1894).

11. A. A. Noyes (conductivities at high temperatures), J. Am. Chem. Soc., *30*, 335 (1908).

12. A. A. Noyes (conductivity and ionization of polyionic salts), J. Am. Chem. Soc., *31*, 987 (1909).

13. Bredig (osmotic pressure and the Van der Waals equation), *Zeit. physik. Chem.*, *4*, 444 (1899).

14. A. A. Noyes (same subject), ibid., *5*, 53 (1890).

15. Abegg (same subject), ibid., *15*, 254 (1894).

16. Freund, Martin, and Achenbach (action of hydroxylamine on certain derivatives of anthraquinone), *Berichte*, *43*, 3251 (1910).

17. Rabe (on a peculiar connection between the strength and action of acids), ibid., *43*, 3308 (1910).

18. Lecture on the manufacture of essential oils (based largely on Muspratt).

19. Lecture on the Grignard reaction.

20. Account of the life of Lord Kelvin.

21. Account of the life and work of Van't Hoff.

22. Lecture on the results of the candidate's own research.

FACILITIES

The University chemical laboratories occupy a considerable part of the laboratory building. The storerooms contain an unusually large collection of organic preparations, besides all the ordinary inorganic chemicals. The collection of physico-chemical apparatus, including the latest form of Pulfrich's refractometer, an excellent Schmidt and Haensch polariscope, a fine spectroscope, a large Hilger quartz spectrograph, a Burkhardt calculating machine, an Altschul apparatus for measuring critical pressures, specially constructed large constant-temperature stillheads, a set of excellent thermostats, sets of fine thermometers, etc., is sufficient for most ordinary purposes. Whatever special apparatus and chemicals are needed in connection with the work of research are ordered at once, every reasonable effort being made to help the student obtain a maximum of results with a minimum expenditure of time and energy. In this connection it may be mentioned that the Department is at liberty to use the services of the skilled mechanician regularly employed by the Department of Physics. Students will themselves prepare their chemicals, or build their research

apparatus, only in those cases in which the Director may consider such work especially instructive to them.

The Director of this Laboratory is Secretary of the Association of American Chemical Research Laboratories, formed at the second decennial celebration of Clark University in 1909. *Inventories of the more important research laboratories are kept here, and any chemical needed in an investigation, if not in our own stock, is promptly supplied by some other member of the Association.* Such exchange of chemicals by laboratories entitled to duty-free importation has recently been declared by the authorities at Washington to be perfectly legal. It is certainly of the greatest help to members of this Department.

THE LIBRARY

The Library of Clark University has, independently of the other departments, a magnificent endowment of its own. Its chemical collection contains complete files of all the more important journals in English, German, and French, and a rapidly increasing number of general treatises, monographs, and reference works. The income of the library permits of purchasing at once *all* books needed by anyone engaged here in chemical research.

Part of the collection, including the files of the *Zeitschrift für physikalische Chemie*, the *Berichte der deutschen chemischen Gesellschaft*, the *Transactions of the Chemical Society of London*, the *Journal of the American Chemical Society*, the *Chemisches Zentralblatt*, and a number of reference works, forming a small departmental library proper, is kept in one of the laboratory rooms and is accessible to all members of the Department at all times. The departmental library, for the establishment of which the Department is deeply indebted to Dr. Louis N. Wilson, University Librarian, is

one of the most valuable aids in the work of both instructors and students. It will be gradually enlarged.

SCHOLARSHIPS AND FELLOWSHIPS

The Department has at its disposal several Scholarships and Fellowships, which will be awarded each year to the ablest and best recommended applicants. Scholars, and especially Fellows, will coöperate with the Director in maintaining a harmonious and scientific atmosphere in the Department and in promoting all the ends of the University. They will have no duties besides that of making the best use of the facilities for study and research offered to them.

RESEARCHES CARRIED ON IN THE DEPARTMENT SINCE THE INSTALLATION OF ITS PRESENT HEAD, SEPTEMBER, 1907

1. Practical elaboration of a new method for determining the partial vapor pressures of organic mixtures, and determination by means of it of the vapor pressures of a number of typical binary mixtures (published; *crowned by the American Chemical Society with the Nichols gold medal of its New York Section*).

2. A quantitative study of the Victor Meyer Esterification Law and the Steric Hindrance hypothesis (published).

3. A quantitative study of steric hindrances in the esterification of fatty acids (published).

4. Perfection of a precise and rapid method for determining halogens in organic compounds (published).

5. A study of the transformation of aldohexoses into alcohol by ferments, enzymes, and alkalies (uncompleted).

6. A new relationship between the vapor pressures of binary mixtures and a general quantitative theory of fractional distillation (partly published).

7. Experimental study of fractional distillation in the light of the results of the preceding research (ready for publication).

8. A theoretical study of the variation of the vapor composition of binary mixtures with the temperature (ready for publication).

9. A study of the mechanism of iodination in the aromatic series by halogen carriers (uncompleted).

10. A new study of steric hindrances in esterification (ready for publication).

11. A precise quantitative study of the phenomena of direct esterification and ester hydrolysis (ready for publication).

12. A study of the kinetics of certain inorganic reactions (temporarily interrupted).

13. A precise study of the decomposition of tertiary amyl esters (one part ready for publication).

14. A peculiar transformation of benzo-bromamide (temporarily interrupted).

15. An improved method for the preparation of acetamide (published).

16. Definition of an Ideal Gas (in collaboration with Professor Webster; published).

17. A new study of the Duhem-Margules equation (in collaboration with Professor Story; nearly ready for publication).

18. A theoretical revision of some of the principles of the theory of solutions (in progress).

19. A new study of the dynamics of sugar inversion (in progress, two parts published).

20. A rapid method for measuring partial vapor pressures (partly published).

21. Limitations of the constant-temperature stillhead (ready for publication).

22. A study of esterification equilibrium in the gaseous state (temporarily interrupted).

23. An improvement of the preparation of para-nitro-phenol (published).

24. Determination of the relative strengths of organic acids (temporarily interrupted).

25. The working of the constant-temperature stillhead in the case of mixtures with maxima or minima in the boiling-point curves (ready for publication).

26. A new lamp, giving an exceedingly intense monochromatic light (ready for publication).

27. A study of certain reactions and derivatives of fumaric acid published).

28. A rapid method of analyzing ternary mixtures of toluene, ethylene bromide, and carbon tetrachloride (ready for publication).

29. A method of determining the molecular boiling-point elevation of solvents (ready for publication).

30. A study of the influence of solvents on the specific rotatory power of substances (in progress).

31. A theory of homogeneous catalysis (published).

IV. BIOLOGY

The aim of the department is to develop investigators well grounded in the history, principles, problems and methods of modern biological science. Since the first step in any research is a knowledge of all that has been learned on the subject to date, the library of the department has been selected with a view to the best classical monographs, texts, journals and especially complete sets of indexes, Jahresberichte and Centralblätter, from which a complete bibliography of any subject can quickly be obtained. Both lectures and laboratory work in the courses described below are especially designed to facilitate practical acquaintance with the methods and apparatus of research, and, as soon as practicable, each student is expected to begin a piece of original investigation. The laboratories are equipped with standard apparatus of most approved types, and if new work requires specially devised apparatus, every effort is made to obtain it. It is thus the aim of the laboratory to place at the disposal of those interested in the solution of biological, physiological and neurological problems the best possible facilities for the prosecution of their work.

The field of modern biological science is so broad that laboratories as well as men are obliged to specialize. The department has for the past few years undertaken to work out a series of problems in the dynamics of living organisms, studies on the activities of animals and plants. Instead of confining attention to structure and form, the attempt has been made to gain an adequate expression for species as forces in nature. This is distinctly a new point of view,

and when we ask such questions of a species as: What do you do? What is your work in the economy of nature? What is your daily life? Your rhythms of work and rest? Do you sleep? Do you play? Do you adapt yourself intelligently or mechanically to your environment? What relation has your work to human interests? What are the conditions of your highest vigor and efficiency? How will this or that change in your environment affect your life? How do you vary?—when we ask these questions of the commonest species, we find ourselves on new ground, alive with new and vital problems.

In this large field studies of the daily life of a series of animals—amœba, vorticella, hydra, earthworm, crayfish, toad, rat, bobwhite—have yielded most valuable results, and other forms equally interesting await study. Another line which is possibly of even greater promise, is the investigation of the effects of different conditions, foods and drugs, exercise, infections of various kinds, on the vigor of the germ plasm and consequent stamina and viability of offspring. Several researches have been made and are in progress and many more are projected in this field.

It is high time that university biology began to concern itself with problems of the adequate control and protection from extinction of valuable American species. Work on the biology of the ruffed grouse, sharp-tailed grouse and bobwhite has been in progress for several years past, a plan to save the passenger pigeon from total extinction has been developed and, if any still remain, gives hope of proving effective; and plans have been sketched for similar studies on the wood duck and woodcock, two other "vanishing species," prairie chicken, wild turkey, wild swans, geese and other water-fowl, and several species of plover whose extinction is imminent. The biology of all these species, and many more must be worked out in detail so that we can know and teach

generally the conditions under which the perpetuation of each and every valuable American species may be assured.

Along with the above considerable attention has been given to organization of biological instruction through the public schools, high school, college and university.

The above will serve to explain briefly the courses offered below.

1. Dynamic Biology and General Physiology. It is proposed to combine in this course the fundamental laws and principles of biological science, the emphasis being placed on the functional or dynamic side rather than on the side of morphological structure. In other words, the point of view of the course is that living species have assumed certain forms and have developed definite structures in order to fit them to perform a certain work in the economy of nature. The first half-year is devoted to the study of a typical series of animals as forces in nature, special attention being directed to American problems and to the methods and apparatus by which dynamics of species may be investigated. On the side of biological theory, which occupies the last half of the year, among others the following topics will serve to outline the scope of the course. Origin and constitution of living matter. Physiological functions. Classifications of plants and animals. Biological reactions, tropisms, experimental morphology. Differentiation of organs. Growth and reproduction. Heredity. Variation. Dr. Hodge, two lectures weekly, October to June. Laboratory work will be arranged to meet the needs of individual students. 1913–1914.

2. Animal Behavior. This course, the materials for which have been collecting for several years, will deal with the normal, biological reactions of a series of typical animals as a basis for experimental work in comparative psychology. It may also serve to suggest to psychologists many problems both for research and for observational study in the laboratory. On the purely biological side we are beginning to see that control of animal life in all its many phases from domestication of species to extermination of undesirable forms depends for success upon a knowledge of the laws and principles of animal behavior. This phase of zoölogy is thus closely related to the economic and will draw naturally from the researches of the scientific departments of the government, the data of which have never before been gathered together and presented from this point of view. The course will be illustrated

by living specimens, so far as possible, and by a complete series of charts already in the possession of the department. Dr. Hodge, two lectures weekly, from October to February, 1913–1914.

3. Biological Instruction. The aim of this course will be to present the results of the Conferences on Biological instruction held in connection with the Second Decennial Celebration of Clark University, and to develop a plan for the organization of such instruction throughout the entire system of education. It will discuss briefly first biological nature study in the elementary schools, consider the problem of the high school course, the history and development of the college course and close with the history, aims and methods of biological research and its present organization in universities and research institutions. Dr. Hodge, two lectures weekly, October and November, 1912.

4. Special Biological Lectures. In this course all members of the Department are given an opportunity to present in lecture form topics—reviews of books and important investigations and particularly results of their own researches. About one lecture weekly, throughout the year.

NEUROLOGY

It is intended to arrange the course in such a manner that the general field may be covered in two years. This will leave the student free to devote his entire time during the third year to special study in the literature of the science and to the prosecution and completion of his thesis work. Accordingly, a two-year cycle will be arranged as follows:

5. Comparative Study of Nervous Systems and Sense Organs. This course will form the natural anatomical background for comparative psychology and together with the working out of a minor problem may well constitute a minor for one whose major is psychology or philosophy. On the biological side it will be closely correlated with general physiology and morphology. It is intended to begin with a comparative study of structural elements of the nervous system of both invertebrates and vertebrates and then correlate and compare the different degrees of complexity of function with the anatomical organization found in the ascending series. The course will be illustrated throughout by diagrams, models, dissections and microscopical preparations and

experiments. Laboratory work one afternoon weekly, or arranged to meet the needs of individual students. One hour weekly, for general class exercise, or its equivalent.

6. The Human Nervous System and Sense Organs. This course will deal with the embryology, histology, anatomy and physiology of the human nervous system and with the gross and microscopic alterations of the nervous structures in the organic nervous diseases and psychoses. Dr. Orton. *One lecture weekly February to June.*

By way of supplementing the above and courses in other departments of the University, three special courses have been planned as follows:

7. Practical Histology. The course will be a laboratory course, with such lectures, directions and conferences as may be required by those taking it. It will be arranged practically to meet the needs of individual students. Considerable latitude will be given, so that any who wish may make it a comparative study by way of supplementing courses 1, 3, 5 or 6, prepare a series of demonstrational specimens for themselves, or devote their time to special problems.

8. For those who do not take work in the laboratory, but desire to see the actual specimens and experiments, a course of demonstrations to run somewhat parallel with the above courses will be offered. One hour weekly, through the year.

EXPERIMENTAL WORK

Laboratory work in biology, physiology, histology, and neurology is arranged to meet the needs of individual students. In case one has not decided on a special line of research, the resources of the department are such that he will be given a fairly wide range of problems from which he may select a subject suited to his tastes and attainments. A course in biology such as is given in our best colleges and State universities is sufficient to enable students to begin work here.

A long-felt need of the department is now supplied in the possession of land well adapted and conveniently located for biological research. Ideal facilities can now be offered for

the study of daily rhythms, life and work of species under natural conditions; and also for experiments in animal and plant breeding. It is proposed to organize an extended series of researches upon the effects of different chemical substances and conditions of life upon the viability and vigor of the germ plasm.

While no regular laboratory fees are charged, each student is expected to refund to the laboratory the cost price of all the more expensive reagents, including alcohol, ether, chloroform, formalin, celloidin, and the like. Each student must supply his own microscopical glass, slides and covers, and must pay the cost price of all glassware that he breaks. All students are expected to take the best possible care of all apparatus entrusted to their charge, and to return it to the laboratory clean and in good order.

THE JOURNAL CLUB meets weekly, for the purpose of reporting and discussing important articles in the current periodicals.

THE BIOLOGICAL SEMINAR devotes one evening weekly throughout the year to special papers upon topics in the historical development of the science and to the reading and discussion of classics in biological philosophy and research.

V. ANTHROPOLOGY

DR. CHAMBERLAIN will lecture twice a week throughout the year. The courses offered endeavor to cover the following field:

GENERAL ANTHROPOLOGY, embracing: (a) History, scope and relations of the science. (b) PHYSICAL ANTHROPOLOGY; problems, investigations, results, laboratory work. (c) ETHNOGRAPHY; races and race-origins. (d) ETHNOLOGY, INCLUDING SOCIOLOGY; origins and development of the arts and sciences, institutions, ideas and ideals of man and the races of man, human civilizations, their origin and development. (e) MYTHOLOGY; folk-lore, religions. (f) LINGUISTICS; race and language, origin and development of language and of languages, psychology of language, gesture-speech and written language, comparative linguistics, comparative literature. (g) CRIMINAL AND PATHOLOGICAL ANTHROPOLOGY; physical and mental; ethnic morals. (h) HISTORICAL AND ARCHEOLOGICAL; primitive man and primitive culture, the precursors of man.

SPECIAL ANTHROPOLOGICAL TOPICS most akin to Psychology and Pedagogy, embodying the results of the most recent and important studies and investigations of the following and other subjects, particularly: The Characteristics in the Primitive Races and their Rôle in Human History; The Physical Anthropology of Infancy, Childhood, Youth, Manhood, Old Age; the Anthropological Phenomena of Growth, Arrested Development, Degeneration; Anthropological Aspects of Heredity and Environment in the Individual and in the Race; Uncivilized Races and Civilized Races; the Phenomena of Race-Mixture; the Evolution Problems of Humanity; Education among Primitive Peoples; the Anthropological History of America; the Interpretation of Folk-Lore; the Psychology of Primitive Peoples; the Trend of Human Progress; the Psychology of Primitive Languages; the Mind of Primitive Man and its Expressions; the Development of Human Personality; the Rôle of the Individual in Primitive Culture; Progress and its Criteria; the Orient and the Occident in their Relations to Human Evolution; the Negro in Africa and in Amer-

ica; the American Indian; the Anthropology of Japan and China; "World Languages" and "World Culture."

The lectures in Anthropology will have special bearing upon the courses in Psychology and Pedagogy in the University, and every effort will be made to utilize the latest results of Anthropological investigations.

From time to time, the most valuable current literature will be reviewed and students made acquainted with the best contributions to Anthropological Science in the various foreign languages. An annotated Bibliography of the "Periodical Literature" of Anthropology, by Dr. Chamberlain, is published quarterly in *Current Anthropological Literature.* Reference may be made also to the article on "North American Indians," in the new (eleventh) edition of the *Encyclopedia Britannica* for orientation concerning one of the primitive races of man. The importance of a thorough acquaintance with the bibliography of their subjects is impressed upon all students, and all possible assistance in this direction is always at their disposal.

VI. PSYCHOLOGY

A complete course in Psychology at Clark University includes the following subjects:

1. Anatomy and Physiology of the Brain and Spinal Cord, sense organs, and other parts of the body, especially the muscles—the organs of the will—in so far as they are concerned with mental processes,—together with a good general background of biology. For this a special laboratory is equipped. See Dr. Hodge's announcement.

2. Physiological and Experimental Psychology, including an outline of the anatomy and physiology of the central nervous system and sense-organs; the elementary sense-experiences; sensation and perception; the measurement of sensational intensity; space; time; reaction-times; affection and emotion; memory; association; attention; apperception; will; the "higher mental processes;" inter-relation of mind and body. For this a special laboratory is equipped. See Dr. Baird's announcements.

3. Comparative and Genetic Psychology. Review of the general doctrine of evolution as a basis for the evolution of mind. Discussion of experimental and observational studies upon typical forms of animal life, beginning with the protozoa. Instincts; animal and human infancy. Childhood and adolescence. See announcement of Drs. Hall, Baird and Porter.

4. Abnormal and Morbid Psychology, as nature's experiments, *e. g.*, border-line phenomena as seen in neurotic subjects, prodigies, and geniuses; defectives, such as the blind, deaf, criminal, idiotic; mental and nervous diseases, epilepsy, phobias, neurasthenia, hysteria; morbid modifications of will, personality and emotion, etc. Special clinical facilities for this work are open to the department in the hospitals and other institutions of the city. See Dr. Hall's lectures and Dr. Cowles' lectures and clinic.

5. Anthropological Psychology; myths, customs and belief, comparative religion and psychology of religion, primitive art, and the study of the life of savages and children; adolescence and senescence; physical

measurements illustrating laws of growth in size and power, etc. See Dr. Chamberlain's courses.

6. Æsthetics and Ethics, the psychology of music, painting, literature, the phenomena and laws of volition and morality.

7. History of Psychology and Philosophy, including the chief culture institutions, science, medical theories, Christianity, and education generally. Dr. Hall's historical courses and seminary.

8. Applications of Psychology, Pedagogy, including mental and moral hygiene and regimen, school organization and methods from kindergarten to university; the sex problem; defectives, etc. Dr. Hall's and Dr. Burnham's courses.

9. The Psychology of Sex; lessons from the aberrations of this instinct; some of its normal phenomena; the current theories; psychic differences between men and women; education of girls; fatherhood, motherhood; instruction of the young in matters pertaining to sex; theories of Freud, Moll, Ellis, etc.

10. The Psychology of Border-Line Phenomena, including spiritism, telepathy, hypnotism, dreams, multiple personality, somnambulism, crystal gazing, dousing, mind reading, sleight of hand performances, major symptoms of hysteria, psychotherapeutics and mind cure, methods of psychological analysis, etc.

The aim of the Psychological department is to cover this field as well as its instructors are able to do so in two or three years.

The following courses are announced for the academic year 1913–1914.

DR. HALL'S COURSES

Dr. Hall expects to give the following courses next year, although variations from this programme may be made if there is reason to believe that the greatest good of the greatest number of students will be thereby promoted:

1. The Psychology of the Feelings and Emotions. This course will involve a brief sketch of the history of the theories in this field and a much more extended account of the recent experimental, clinical and genetic work done in this department. The purpose of the course is to give a clear account of the present condition of our knowledge of each of

the feelings, one after another, pleasure and pain, fear, anger, sympathy jealousy, love, hate, etc.

2. Psychogenesis. This course will begin with an account of the theories of the origin both of life and of mind, with chief emphasis upon the latter. There will be a survey of the results of experimental biology, concerning elemental life or substances that resemble it, then experiments and observations upon the simplest organisms. This will be followed by a résumé of our knowledge of certain typical forms of animal instinct up the series, and upon this basis the contributions to paleontology will be drawn upon and certain lessons as to the development of the instinct of type forms of life; the horse, camel, monkey and other typical forms will be dwelt upon at some length. This will be followed by a brief account of culture stages of the human race from the paleolithic age and that of the troglodytes up.

3. The Unconscious or the Subconscious. This course will begin with a brief outline of the theory of consciousness and unconsciousness and the place of each and their relations, and will then pass to the subjects to be chiefly considered, viz., dreams and their recent studies; hysterical phenomena; the teachings of Janet, Freud, Jung; psychoanalysis; individual psychology, particularly that of temperament and character.

4. Some Vital Problems in Education. This course will be given Saturdays for teachers and the special field it covers will be announced later.

5. The Seminary, at Dr. Hall's house, three hours every Monday evening through the year.

6. Researches with individuals on special topics.

EXPERIMENTAL PSYCHOLOGY

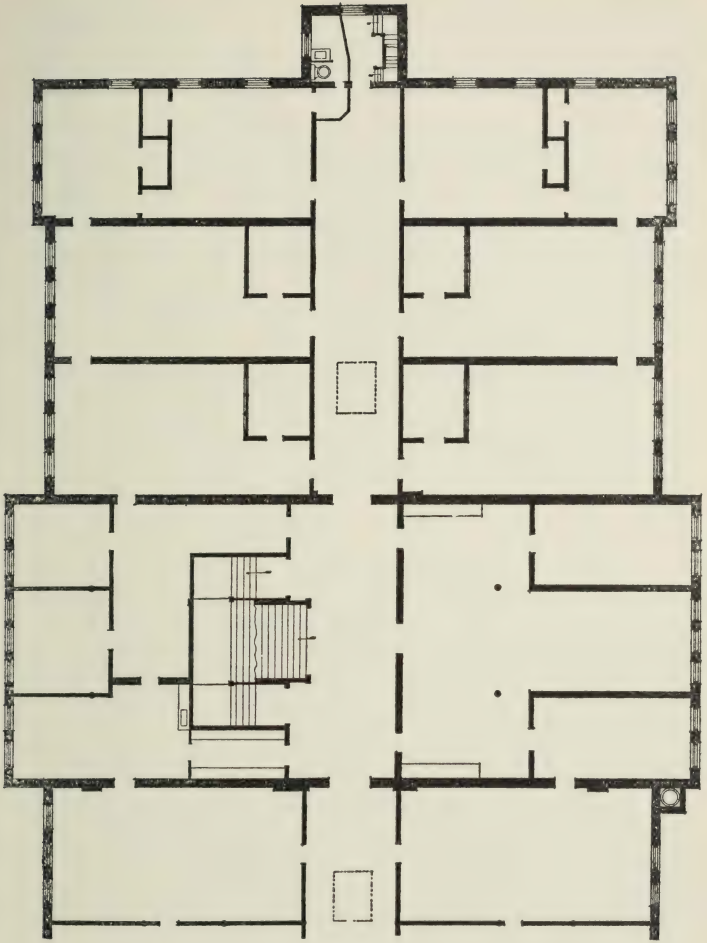
The primary purpose of this department is to train students for the investigation of psychological problems. The lecture courses and the Journal Club aim to familiarize the student with the history and the present status of psychological experimentation; the laboratory courses are arranged with a view to training him in experimental procedure, and equipping him for independent research.

The psychological laboratory occupies a suite of twenty rooms on the upper floor of the main building of the university. These rooms, as at present arranged, are devoted to the following purposes: office, lecture-room, seminary and reading-room, dark-room, work-shop, general apparatus-room, and a group of rooms for research.

The laboratory is well equipped with general apparatus; and it has an annual appropriation sufficient to provide for the purchase and manufacture of such apparatus as is required from time to time for special investigations. The work-shop contains power- and other lathes, a power-drill, and an abundant equipment of tools and materials for the manufacture and repair of apparatus. The services of an expert mechanician are available; and every facility is provided for the devising and constructing of apparatus appropriate for the solution of such special problems as are undertaken.

The library contains an unusually large collection of psychological literature. It is especially well supplied with scientific periodicals and proceedings of learned societies. Since the enrolment of the department consists exclusively of graduate students, and is, therefore, relatively limited in numbers, it is possible to give to each student of the department a maximum of freedom in the use of the library. Besides having access to the university library, students of the laboratory have at their disposal an excellent working-library of psychological books and periodicals which are shelved in the seminary-room.

The more general and fundamental courses of lectures in the department are repeated each year, while the more advanced and specialized courses are given only in alternate years. A feature of the method of instruction at Clark University is the frequent informal conferences between in-



PSYCHOLOGICAL LABORATORY

structor and student. The Journal Club meets weekly (two-hour sessions) for the discussion of the current literature. The more valuable contributions presented by the members of the Club will be published in the *American Journal of Psychology*. The laboratory work includes an introductory and a research course. The former is designed to familiarize the student with the efficient handling of apparatus, and to acquaint him with the methods to be followed and the precautions to be observed in psychological experimentation. This course is repeated each year; it, or its equivalent, is a prerequisite to all other work in the laboratory. The research varies from year to year.

Provision for Comparative Psychology is now made at the Hadwen Arboretum, about fifteen minutes' walk from the main building of the University, where special facilities for the care of the animals have been provided.

DR. BAIRD'S AND DR. FERNBERGER'S COURSES

1. GENERAL PSYCHOLOGY. A course of lectures and demonstrations dealing with sensation, affection, attention, volition and perception. This course will present, in concrete and systematic form, the more important facts that have been yielded by the experimental investigation of the simpler mental processes, together with a discussion of theories that have been advanced from time to time. DR. FERNBERGER. *Two hours a week. First semester.*

2. THE APPLICATION OF STATISTICAL METHODS TO PSYCHOLOGY A course of lectures and demonstrations in which will be considered the calculations necessary for the practise of the psychophysical methods and also the relation between the methods. The distribution of relative frequencies, correlation and similar topics will also be considered. DR. FERNBERGER. *One hour a week. Second semester.*

3. THE PSYCHOLOGY OF MEMORY, IMAGINATION AND THE PROCESS OF LEARNING. Lectures and demonstrations dealing with the phenomena of mental acquisition and retention; imagery, association and reproduction, the phenomena of learning and forgetting, the function and development of habits. DR. BAIRD. *Two hours a week. Second semester.*

4. The Psychology of the Higher Intellectual Processes. The psychology of meaning, abstraction, thought, judgment, reasoning; the function and significance of imagery; the phenomena of *Bewusstheit*, *Bewusstseinslage*, *Aufgabe*, *Einstellung* and *determinierende Tendenz*. Dr. Baird. *One hour a week.*

5. Psychological Systems. A statement and discussion of the characteristic features of the systematic doctrines embodied in the writings of representative psychologists, past and present. Dr. Baird. *One hour a week.*

6. Journal Club. A seminary for the informal discussion of current psychological literature. Meetings are held weekly throughout the year.

7. Introductory Experimental Course. In this course the student will perform a series of standard psychological experiments, chiefly for the purpose of mastering the technique of experimentation. The course will be given by Dr. Baird, Dr. Fernberger and Mr. Finkenbinder. *Four to six hours a week, throughout the year.*

8. Research Course. Under this title are grouped the special investigations undertaken by students in the laboratory. *Topics and hours to be arranged.*

DR. TSANOFF'S ANNOUNCEMENT OF COURSES

1. History of Modern Philosophy. A lecture-course dealing with the main currents of philosophical thought since the Renaissance and the dominant tendencies and problems of present-day philosophy. *One hour a week.*

2. Ancient and Mediaeval Philosophy. An historical outline, with reports and discussions of special problems; specially intended as a general review for students wishing to deal in greater detail with particular periods of Greek and scholastic philosophy. *One hour a week.*

3. Post-Kantian Philosophy. A somewhat technical study is attempted of the development of German philosophy during the nineteenth century; special emphasis is laid on the rôle played by the Critical philosophy in the evolution of the modern idealistic conception of Experience. *One hour a week.*

The following courses offered by Professor James P. Porter in Clark College are open to students in the University:

1. General Psychology. Three hours a week, throughout the year.

2. Social Psychology. Three hours a week, throughout the year. Omitted 1913–14.

3 a. The Evolution of Mind and Genetic Psychology. Three hours, first semester.

3 b. Educational Psychology. Three hours, second semester.

4. Laboratory Course in Experimental Psychology. Three hours a week, throughout the year.

At the Hadwen Arboretum, where a "station for the study of animal behavior" has been established and is now under Dr. Porter's direction, are found facilities for the study of certain forms of animal life; and here too will be found some of the illustrative material for his lectures.

VII. PEDAGOGY

This department offers a course which can be taken for the degree of Doctor of Philosophy. Its work is in the closest connection with that of psychology and anthropology, and in part based on these subjects. The work in this department is intended to meet the needs of the following classes of students.

First. Those intending to teach some other specialty but who wish a general survey of the history, present state, methods, and recent advances in the field of university, professional and technical education.

Second. Those who desire to become professors of pedagogy, or heads or instructors in normal schools, superintendents, or otherwise to become experts in the work of education.

The programme of the Pedagogical Department includes courses upon the following subjects:

1. (*a*) Child Study. (*b*) Pedagogical Psychology. (*c*) Experimental Pedagogy. (*d*) School Hygiene.

2. (*a*) Principles of Education. (*b*) History of Education and Reforms. (*c*) Methods, Devices, Apparatus, etc.

3. (*a*) Organization of Schools in Different Countries. (*b*) Problems of College Education. (*c*) The Teaching Profession. (*d*) Motor Education, including manual training, physical education, etc. (*e*) Moral and Religious Education. (*f*) Ideals.

The courses in pedagogy for 1913–1914 will be as follows:

DR. WILLIAM H. BURNHAM'S COURSES

A. Pedagogical Applications of Psychology. Some of the most important chapters in psychology in their educational aspects, such as habit, attention, interest, memory. Such topics as the following are

discussed: The correlation of physical and psychic processes. The child as a reacting organism. The fundamental instincts of children as the basis of apperception and interest; imitation; rivalry; co-operation. Suggestion as a factor in education. Education of the senses. Apperception and association. Defects of memory. Experimental investigations of memory. The learning process. Economical methods of learning. Feeling and interest in relation to instruction and training. Mental attitudes. The training of the will. Mental diseases and the faults of school children. Neuroses of development. Psychological contributions to hygiene. The point of view is that of genetic psychology. *Once a week, throughout the year.*

B. Hygiene of the School Child. This course is supplementary to the course on the Hygiene of Instruction given in 1912–13. Some of the more important chapters in modern school hygiene will be considered, including such topics as: The conditions that determine growth and development. Physiological age. The physical and mental differences between children and adults. The general principles of somatic and mental hygiene. The hygiene of the senses. Modern studies of defects of sight and hearing. School diseases. The hygiene of the voice, the mouth, the teeth, the nose. Tests of ability to work and of physical condition. Medical inspection. The hygiene of discipline. The development of healthful mental activity. The hygiene of memory, attention, and feeling. The hygienic aspects of recent psychological studies. Problems in mental hygiene and the hygiene of instruction. *One hour a week, throughout the year.*

C. Seminary. The work will be determined in part by the needs of the students who elect this course. It will probably be devoted chiefly to genetic pedagogy and to school hygiene. It is hoped, also, that each student will select, after consultation with President Hall and Dr. Burnham, a topic for special investigation. The results of such studies may be published. *One or two hours a week, throughout the year.*

PRESIDENT G. STANLEY HALL'S COURSE

Some Vital Problems in Education. See special circular later.

DR. EDMUND C. SANFORD'S COURSE

The Problems of College Education. A discussion of the most important questions of college efficiency with

especial reference to present day tendencies and criticisms. *One hour a week throughout the year.*

DR. CAPEN'S COURSE

During the past year Dr. Samuel P. Capen has given a course of lectures on The Principles of School Administration with special attention to the English school system. A similar course devoted to the French and German systems will be given during the academic year 1913–14. *One hour a week, half a year.*

The courses as announced above may be modified somewhat as the needs of the students or other circumstances may require.

THE CHILDREN'S INSTITUTE

The Children's Institute, under the auspices of the Educational Department of Clark University, provides courses of lectures each year upon at least one of the following topics.

(*a*) A general survey of child welfare institutions in this country and abroad with the use of demonstrative material in the form of reports, circulars, etc., by Dr. Theodate L. Smith, who also gives practical aid in the preparation of theses touching this subject.

(*b*) A course on the examination and treatment of subnormal and defective children with clinical demonstrations.

(*c*) A course in experimental pedagogy including the questionnaire and statistical methods and a survey of the history and literature.

The Children's Institute has a large hall with three adjacent rooms, including one entire floor in the new Library Building devoted to an educational museum, which is equipped with hundreds of maps, charts, diagrams, illustrative and other apparatus gathered from many countries, to ease the

work of teaching and make it more effective. This material is used in various departments, but especially by that of Education.

Special attention has been given to the collection of the circulars and other publications of nearly one hundred types of child welfare organizations with which the department seeks to keep in touch.

The library of the department has a large collection of EDUCATIONAL LITERATURE, being especially rich in German and French literature, and having a large number of official reports from various countries—English, French, German, Belgian, Swedish, etc.; also town and city reports, and reports of special institutions; and a collection of French, German, and American text-books.

The books are arranged under the following heads:

1. GENERAL.
2. HISTORY OF EDUCATION.
3. EDUCATIONAL SYSTEMS.
4. THE THEORY OF EDUCATION AND SPECIAL SCHOOL SUBJECTS.
5. EDUCATIONAL PSYCHOLOGY.
6. CHILD STUDY.
7. SCHOOL HYGIENE AND PHYSICAL EDUCATION.
8. TEXT-BOOKS.
9. MISCELLANEOUS.

Many of the more common educational books are accessible in the Worcester Public Library and have not been duplicated by the University. The large collection of educational text-books in the library of the American Antiquarian Society and its valuable historical material are also accessible to the University.

The collection of educational periodicals includes a large

number of the best foreign journals—English, French, German, Swedish, etc.

The nucleus of an educational museum has been formed. This is now merged with the museum of the Children's Institute, and contains a valuable collection of educational apparatus, pictures, illustrative material for language lessons, *Anschauungsunterricht*, toys, kindergarten material, maps, charts, diagrams, text-books, lantern slides, moving picture films, photographs, and illustrative material of various kinds in school hygiene, history, arithmetic, language, the natural sciences, etc. One room contains a collection of apparatus for the teaching of arithmetic, abacuses of various kinds, charts for counting, reckoning machines, number tablets, weights, measures, geometrical models, and astronomical charts and apparatus. Another room contains a collection of toys from different countries, a number illustrating scientific principles in physics and the like. A third room is devoted to apparatus and illustrative material in school hygiene. The collection includes seats and desks, charts illustrating good and bad posture, hygrometers, apparatus for ensuring cleanliness, for testing the air, charts illustrating the incidence of school diseases, the effects of antitoxins, etc. and a collection of the antitoxins for the various diseases. The main room is largely filled with pictures, models, maps, charts, and illustrative material for teaching the different school subjects and the different sciences. A catalogue of the department of School Hygiene in the Museum has just been published. It is hoped that catalogues of other departments will soon be prepared. This museum is open to students, teachers, and others at definite times. It is now under the direction of Professor W. H. Burnham.

The *Pedagogical Seminary* is a journal issued at the University, and serves as a convenient medium of publication for special investigations undertaken in the department.

In addition to the members of the University, special students are admitted during the year to the Saturday courses of Drs. Hall, Burnham and Capen in Education, for a fee of $20.

VIII. ECONOMICS AND SOCIOLOGY

The courses here outlined indicate the scope of the work offered. At least two hours work per week and a seminar are given each year.

1. Recent Economic Theory. This course is devoted to a comparative study of the theories of Marshall, Clark, Böhm-Bawerk, Fetter, Hobson and Carver, as presenting leading types of modern economic theory. The chief emphasis is placed on the problems of value and distribution; on the tendencies toward monopoly and other interferences with normal adjustments; and on the influence of the growth of co-operation and consolidation. This course should be preceded by at least an elementary study of economic theory. *One hour per week.*

2. Principles of Interpretation in Sociology. This deals with the various principles that have been used to interpret history and society. Various viewpoints and principles are taken up in turn, analyzed, their advantages and limitations discussed, and the results achieved by each indicated. Among those studied are: anthropo-geography; the philosophy of history; the great man theory; religion as a factor in social evolution; the economic interpretation of history; social economics; philanthropy; biological and organismic conceptions; the struggle of races; the division of labor; human interests; social control; imitation; social psychology; and like response to stimulus. *Two consecutive hours per week.*

3. Problems of Population. Considers various laws of population as developed by Malthus, Spencer, Nitti and others; vital statistics, birth and death rates, heredity and selection with some attention to statistical methods; theories of racial decay; eugenics and race-regeneration; and biological and sociological conditions affecting the supply of genius. Lectures, reports, discussions. *Two consecutive hours per week.*

4. Seminar. Given to reports on theses and selected portions of the current literature; some special inquiry along sociological lines is also pursued. *Two consecutive hours bi-weekly.*

IX. HISTORY

Dr. Blakeslee offers the following courses:

1. United States History. Different periods are taken for intensive study in successive years. In 1910–11 the course dealt with the history of the United States from the Missouri Compromise to the outbreak of the Civil War, with emphasis upon the years following the Compromise of 1850. It treated especially the institution of slavery as it existed in the Southern States, the origin and growth of the abolition sentiment, the doctrine of states rights, and the development of the antagonism between the North and the South till its culmination in the Civil War. In 1911–12 it covered the period from the close of the Civil War to the present time, and included the economic and social development of the country during these years as well as the history of politics; in 1912–13 it includes the period from the formation of the constitution to the Missouri Compromise. The lectures are supplemented by reports presented by students upon assigned topics. *Two hours.*

2. The Expansion of the United States. The history of the successive territorial acquisitions of the United States is given, including the diplomatic negotiations and the relations with foreign powers. This is followed by a study of the constitutional questions involved, especially those regarding the status of newly acquired possessions and of present-day dependencies; the differences between incorporated and unincorporated territory; and the rights and privileges of inhabitants and citizens of the various lands considered. The aims and the continuity of the American Colonial policy are pointed out. *One hour.*

3. International Law. The aim of this course is to give a knowledge of the general principles of International Law. So far as possible definite cases are studied, and for that purpose Scott's "Cases on International Law" are followed. Especial attention is paid to the legal questions involved in the existing international controversies; to the history and present status of arbitration; and to the modifications in International Law introduced by such international Congresses as those held at the Hague. The study of the leading authorities and of cases is supplemented by lectures and discussions. *Two hours.*

4. English History—The Period of the Tudors and the Stuarts. This course extends from the accession of Henry VII, in 1485, to the death of Queen Anne, in 1714, and deals especially with the establishment of practical absolutism under Henry VII and Henry VIII; the rise of Protestantism; the development of Puritanism in state and church; the great Civil War; Cromwell and the Puritan ascendency; the attempts to form a firm constitutional government; the relation of English Puritanism to that of Switzerland and New England; the restoration of monarchy; and the final triumph of Parliament in the overthrow of James II. Emphasis is placed upon the study of the constitutional documents and other sources. *Two hours.*

5. The History of the Christian Church—From the Days of the Apostles to the Close of the Reformation. The leading topics considered are: the pre-Constantine church, including the persecutions and the formation of a definite ecclesiastical organization; the effects upon the church of Constantine's conversion; the Nicene creed and the early heresies; the conversion of the barbarians and its reflex action upon the church; monasticism; the rise of the Papacy; the mediaeval church at its height; the rise of heresy—Wyclif, Huss, Savonarola; the reformation—Luther, Zwingli, Calvin; the Catholic Reformation; and the religious wars of the sixteenth and seventeenth centuries. *Two hours.*

6. Russia. The lectures discuss particularly the revolutionary movement, including the abuses of autocracy and bureaucracy, the character and methods of the revolutionists, the economic and political ability of the peasants, the widespread acceptance of socialism by the educated classes, the influence of the church, and the recent reforms by the government. *One hour. One Semester.*

7. The Far East. The lectures deal with Russia in Asia; Japan, with its colonies, Formosa and Korea; Manchuria, including the history and present status of the struggle for its control; China and the present revolution; the Philippines and Hawaii; and the International politics of the Far East and of the Pacific Ocean. *One hour. One Semester.*

8. British Colonies and Dependencies. This course includes a survey of the important political, economic and social conditions in the leading British possessions, especially in Canada, Australia, New Zealand, India and Egypt; and a discussion of British colonial policy and problems. *One hour. One Semester.*

9. The Near East and Africa. This includes a discussion of the Balkan situation; the history, the achievements, and the problems of

the Turkish Revolution; the extent and the significance of the political awakening and the religious revival throughout the Mohammedan world; the causes, progress and results of the Balkan-Turkish war; the history of the partitioning of Africa among the European powers; the character of European government in Africa, especially that of the Congo Free State; the results of the Boer war in British South Africa; the nationalist movement in Egypt and the successes and failures of the British administration; the achievements of the native races; and a study of the results and the methods of mission work. *One hour.*

10. HISTORICAL SEMINAR. The students in the Department of History meet once a week in a seminar for the consideration of particular topics of historical interest. Each member is expected to present reports during the year, which then form the basis for a critical discussion. Some of the subjects presented in the past have treated of conditions in India, Tibet, the Congo Free State, Manchuria, Turkey, Russia in Asia, China, Japan, Korea, the Philippines and Egypt.

During the present year, 1912–13, courses 1, 2 and 3 are given.

The most distinctive feature of the work in this Department is the insistence that its students shall obtain a general knowledge of the history of the world as a whole, not merely of the United States and of three or four of the states of Europe. The laws of historical development can be fully understood only after a study of all important peoples, including those in Asia and Africa. Emphasis is placed upon existing conditions, both because these are most vital and because they furnish the richest material for a comparative study of the different stages in the world's political, economic, social and religious advance.

In carrying out these features of its work, the Department has assisted the President of the University in arranging annual conferences for the discussion of the history and the present-day conditions of various lands. In 1909 the sessions dealt with the Far East, including China, Korea, India, the Philippines and Hawaii; in 1910 with the Near East and Africa; in 1911 with Japan and Japanese-American relations; and in 1912 with Recent Developments in China.

Altogether more than one hundred and thirty men have taken part in these conferences,—University professors, anthropologists, leading natives, government officials, travellers and missionaries—all of whom could speak with authority. Their addresses and papers are published by the University in the Journal of Race Development.

LIBRARY

The Library is under the control of a Library Committee, appointed by the Trustees, of which the President of the University is *ex officio* chairman. The duties of this committee are to advise concerning the arrangement, cataloguing, use of books, and other matters pertaining to the Library not reserved to the Trustees nor otherwise provided for.

Library Committee

President G. Stanley Hall, *Chairman*
President Edmund C. Sanford
Professor William E. Story, *Secretary*

Library Staff

Louis N. Wilson, *Librarian*

ASSISTANTS

Edith M. Baker, *Senior Assistant*
Helen J. Elliot, *Cataloguer*
Mary D. Thurston, *College Library*
Beatrice M. Abbott
Elsie L. Basset
Helen F. Gates
Joyce Knowlton
Theodate L. Smith

The Library building is situated on the corner of Main and Downing streets. The Public Opening of the new building was held January 14th, 1904. A full description of the building and of the Proceedings at the Opening will be found in the *Publications of the Clark University Library* for April, 1904 (Vol. 1, No. 3).

The College Library and study rooms occupy the lower floor of the new building, opened in September, 1910, and described in the College Record, July, 1910, Vol. 5, pp. 185-187.

The Library contains about 62,000 bound volumes and pamphlets, and the reading-room receives over 400 journals.

The books are grouped as follows:

A	Works of General Reference	L	Biography
		M	Anthropology
B	Journals	N	Education
C	Mathematics	O	General Science
CD	Math.-Physics	P	History
D	Physics		
DE	Physical Chemistry	R	Political and Social Science
E	Chemistry		
F	Biology, Zoölogy, Botany, Physiology, Neurology	S	English
		T	Modern Languages
G	Geography	U	Classics
H	Pathology	W	Practical Arts
I	Psychology	X	Library Science
J	Philosophy	Y	Art
K	Religious Psychology	Z	Manuscripts

Tuesday and Friday mornings, each week, all books recently added to the library are placed upon a table in the Reference section where they remain for three days. This affords the members of the University and College an opportunity to examine the new books in all departments before they are placed upon the shelves for circulation.

About once a month, during term, by the courtesy of our booksellers, new books are placed for inspection on one of the tables in the Reference section. Any member of the University or College may recommend the purchase for the library of books thus displayed, and such recommendation will receive prompt attention.

All books are classified by the heads of departments and particular attention is paid to the needs of students engaged in research work. The library already possesses a good collection of complete sets of the best scientific periodicals. It makes liberal purchases for individual needs and supplements these by drawing upon the resources of the older and larger libraries through the inter-library loan system. During the past year 588 volumes were borrowed from, and 317 volumes lent to, other libraries. The number of books added each year is about four thousand volumes.

The publications of the Library, edited by the Librarian, and begun in October, 1903, are as follows:

VOL. I.

No. 1. WILSON, LOUIS N.
Bibliography of the Published Writings of President G. Stanley Hall. Oct. 1903

No. 2. WILSON, LOUIS N.
Bibliography of Child Study for the Year 1902. Jan. 1904

No. 3. Proceedings and Addresses at the Public Opening of the Library Building of Clark University, Thursday, January 14, 1904 Apr. 1904

No. 4. WILSON, LOUIS N.
Bibliography of Child Study for the Year 1903. July 1904

No. 5. WILSON, LOUIS N.
Preparing Manuscript for the Press. Jan. 1905

No. 6. Founder's Day, Clark University. Apr. 1905

No. 7. WILSON, LOUIS N.
Bibliography of Child Study for the Year 1904. July 1905

No. 8. DE PEROTT, JOSEPH
The Probable Source of the Plot of Shakespeare's Tempest. Oct. 1905

No. 9. Proceedings and Addresses at the Public Opening of the Art Department of Clark University. Dec. 1905

VOL. 2.

No. 1. List of Books and Pictures in the Clark Memorial Collection. July 1906

No. 2. WILSON, LOUIS N.
Bibliography of Child Study for the Year 1905. Oct. 1906

No. 3. WILSON, LOUIS N.
A few Titles in Child Study. Apr. 1907

No. 4. Proceedings at the First Annual Banquet of the New England Association of Alumni of Clark University, and at the Banquet of the Washington, D. C., Alumni Association, 1907. June 1907

No. 5. WILSON, LOUIS N.
Bibliography of Child Study for the Year 1906. Aug. 1907

No. 6. WILSON, LOUIS N.
Bibliography of Child Study for the Year 1907.
Sept. 1908

No. 7. MACLAURIN, RICHARD C.
The Outlook for Research (Founder's Day Address, Feb. 1, 1911). Mch. 1911

No. 8. WILSON, LOUIS N.
List of Papers in the Field of Religious Psychology Presented at Clark University. July 1911

No. 9. WILSON, LOUIS N.
List of Degrees Granted at Clark University and Clark College.
Oct. 1911

VOL. 3.

No. 1. ROETHLEIN, BARBARA ELIZABETH
The Relative Legibility of Different Faces of Printing Types.
Jan. 1912

No. 2. WILSON, LOUIS N.
Suggestions for a Model Private Library at Clark College.
Feb. 1912

No. 3. BURNHAM, WILLIAM H.
Bibliographies on Experimental Pedagogy. July, 1912

The department of religious psychology, established within the past few years has grown rapidly and supports The *Journal of Religious Psychology*. The Journal is edited by President Hall and Professor Chamberlain and is now in its sixth volume.

The books in the Art Department are accessible on application to the librarian, but, by the terms of the Founder's will, they cannot be taken from the building.

All the privileges of the library are open to all members of the University, and each member has direct access to every book and journal.

The library is open from 8 a.m. to 6 p.m. each week day from Sept. 1 to July 1. During July and August it is open from 8 a.m. to 5 p.m. from Mondays to Fridays, and on Saturdays from 8 a.m. to 12 m. The library is closed July 4th, Thanksgiving Day and Christmas Day.

Outside the University are found:

The Library of the American Antiquarian Society, organized in 1812, and containing over 120,000 volumes, accessible to all members of the University.

The Worcester Public Library, containing 600 newspapers and magazines and 175,000 volumes, has, in the past, to some extent supplemented the scientific publications purchased by the University, and all its privileges are accessible without charge.

The Library of the Worcester District Medical Society of about 10,000 volumes, is also free to all members of the University.

LIBRARY RULES

No loud talking is allowed in any part of the Library.

Every book shall be returned at the end of one calendar month from the time at which it was taken out, but may be called in at any time at the discretion of the Librarian.

Current numbers of periodicals shall not be taken out until they have been in the Library ten days.

All dictionaries, cyclopædias, and books of general reference are permanently reserved.

Reserved books and current numbers of periodicals, exempt from circulation, may be taken out after 5.30 p.m., but

must be returned before 9 o'clock the next morning, excepting that such books and periodicals may be taken out Saturdays at 12 o'clock m., and may be kept until 9 o'clock the next Monday morning.

Readers must not write nor make any mark upon any book, manuscript, map, or other property belonging to the Library.

Any breach of the above Rules will involve suspension of the Library privileges until personally restored by the Librarian. All such cases shall be laid before the Library Committee at their next meeting.

ART DEPARTMENT

In his last will and testament the Founder of the University bequeathed

"the sum of $100,000, as an endowment fund for the Art Department of said University, and said sum is to be held and kept sacred and intact as a principal not to be used or expended under any conditions; but the income, interest or proceeds thereof shall be used only in putting and keeping said works of art or others given or obtained for said department in good condition and in taking care of them; and then if there is a surplus of the income of said fund left, I will and direct that it be used in the purchase of additional works of art or of such matters as will add to the usefulness and efficiency of said Art Department."

Under these conditions a large room has been furnished and equipped on the upper floor of the Library Building. Upon the death of Mrs. Clark, those of the Founder's collections that were deemed most suitable for this purpose were arranged and displayed in this room, together with

his most valuable books, which, by the conditions of the will, cannot be removed from the building. A complete catalogue of these books and paintings has been published in the PUBLICATIONS OF THE LIBRARY, Vol. 2, No. 1.

A Curator and Custodian have been appointed by the Board (see page 116) and all the collections are now accessible to visitors. The Art Department is open daily (except Sundays) from 9 a.m. to 5 p.m.

In 1909 there was added to the collection a large oil portrait of the late Carroll D. Wright, President of the Collegiate Department from 1902 to 1909. The painting is by the late Frederick P. Vinton of Boston and received the Temple Gold Medal at the 1909 Exhibition of the Pennsylvania Academy of the Fine Arts. In the spring of 1911 a similar portrait of President G. Stanley Hall of the University, also painted by Mr. Vinton, was added, to the collection.

Scale models of the two new buildings and the University grounds have been made by T. J. McAuliffe and Son of Worcester, under the direction of the architects, Messrs. Frost, Briggs and Chamberlain.

REGULATIONS

1. All requisitions for apparatus must be made through the Bursar's office upon printed blanks provided for that purpose and signed by a member of the staff.

2. So far as possible, orders for only the kind and amount of apparatus certain to be used during the year shall be placed; nothing shall be ordered for future years, and apparatus for research shall take precedence over that for teaching and illustration only.

3. Requisitions for repairs, furniture, plumbing and work about the buildings must be made through the Bursar's office in writing and with detail, and, when once passed upon, no change involving additional expense can be made in the requisition without the consent of the Finance Committee.

4. No unappropriated rooms and no part of the University grounds shall be used for any purpose, and appropriated rooms shall not be used for other purposes than the stated University work for which they were intended, without previous permission from the office.

5. Unless for special reasons, absence of instructors from their stated exercises or from town for two consecutive week days in term time should be announced at the office, and for longer absence permission should be obtained beforehand.

6. The Trustees desire that no Instructor, Docent, or

Fellow shall enter upon other engagements outside his proper work in the University of a kind or amount likely to lessen his full efficiency for science within the University.

7. Appropriations shall hereafter cover all apparatus and supplies of whatever nature for laboratories, for demonstration or illustration; all metal and carpenter work connected with the scientific activity of each department; and every form of special service. Appropriations, however, shall not hereafter cover orders for books or journals, which shall be submitted to the Library Committee.

8. The several appropriations made to individual instructors and others shall be the full and fixed limit of the liability of the University, to be on no account transcended; and for every excess over the appropriations, from whatever cause, the instructor making the order shall be personally responsible.

9. No order for any purpose shall be paid by the University, whether on appropriations or for general supplies, that has not passed through the Bursar's office.

10. The President, Professors, Assistant Professors and regular Instructors authorized by the Board to do graduate work, together with the Librarian, shall constitute the Faculty of the University. Its meetings shall be called and presided over by its President, or, in his absence, by a Professor whom he shall designate. The Faculty shall elect a Secretary and its records shall always be accessible to the Trustees. Its jurisdiction shall include all matters pertaining to the instruction, conduct and discipline of students, and such other duties as may be prescribed by the Trustees.

11. The President of the University shall make, at the October meeting, an annual report on the condition of the departments and their work during the year and shall have authority to require and receive from all Instructors and Officers of the University and Library such reports as he may deem necessary. A copy of these reports, including that of the Library, shall be deposited with the Mayor of the City.

12. The University Faculty shall have the oversight of all graduate work and shall recommend for the Master's, Doctor's and all other graduate degrees upon such terms, conditions, and forms as it may determine, and exercise such other functions and responsibilities as are not expressly assigned to the Trustees or to the Collegiate Department.

13. The Custodian of the Art Collection shall have general oversight over its room in the Library Building and its contents, together with their care and use, under the direction and control of the Curator. The Curator shall from time to time submit to the Trustees his recommendations for the purchase of additional works of art from the income of the Art Fund, based on and together with the opinions of experts as to their value and desirability. All such purchases shall be approved by the Board of Trustees, or by such a committee of their members as they shall appoint for that purpose.

14. The President of the University shall make an annual report to the Trustees of the action of the Library Committee, of which he is Chairman, and this report, if approved, shall be filed and preserved.

DEGREES CONFERRED

On June 18, 1912, the University conferred degrees upon the following persons:

MASTER OF ARTS

Ivy Gertrude Campbell
Thesis: A study in pre-Socratic Greek philosophy.

Katherine Ella Dolbear
Thesis: Precocious children.

Dorothy Drake
Thesis: The pedagogy of toys.

Merton Taylor Goodrich
Thesis: On the forms of plane curves of the fourth class.

Merritt Roy Grose
Thesis: A study of the reactions of certain maleinoid and fumaroid compounds with amines.

Samuel Winfield Hirsch
Thesis: The economic, political and social status of the American negro since 1860.

Harry Louis Jackson
Thesis: Housing conditions in Worcester.

Ransom A. Mackie
Thesis: Recent high school reorganization: A study of education during adolescence.

Herman Monroe Potter
Thesis: The influence of water on the velocity of sugar hydrolysis.

Charles Webster St. John
Thesis: The psychology of senescence: An introductory study.

John Frederick William Schulze
Thesis: The fractional distillation of binary mixtures.

William Kendrick Schwab
Thesis: Brazil—the United States of South America.

Rosie Gardner Squier

Thesis: The natural history and daily life of the house fly.

Annie Elizabeth Stoy

Thesis: Suggestion in elementary education.

Robert James Streeter

Thesis: Unemployment: Its causes and proposed remedies.

Robert Morse Woodbury

Thesis: Colora: A study in rural sociology.

Elias Yanovsky

Thesis: Esterification catalysis

DOCTOR OF PHILOSOPHY

Eugene William Bohannon

Dissertation: Exceptional children and the only child in the family.

John Madison Fletcher

Dissertation: An experimental study of some of the in-coördinations of functional speech disturbances.

Frank Eugene Howard

Dissertation: The pedagogy of the emotions.

Karl Johan Karlson

Dissertation: Psychoanalysis and mythology.

John Milton McIndoo

Dissertation: Instinct as related to education.

Tadaichi Ueda

Dissertation: The psychology of justice.

The following gentleman also has taken the examination for the doctor's degree, but has not yet completed all the formal requirements:

A. Caswell Ellis

PUBLICATIONS

A Register and Official Announcement is issued each year in February or March.

In the years 1890, 1891, 1893, and 1902, the annual Report of the President to the Board of Trustees was printed.

A Summer School was held for nine years ending in 1903, and in such years a Summer School Programme was issued.

In July, 1899, the University observed its tenth anniversary, and published the following volume:

Clark University, 1889-1899. Decennial Celebration. 8 x 11 in., pp. 566. Published for the University. Price, $5.00. Contains the lectures delivered by Professors Picard, Boltzmann, Ramon y Cajal, Mosso and Forel at the Decennial Celebration, July, 1899; also reports by the heads of departments on their aims and ideals, with a list of past and present members of the University and the titles of their published papers.

Proceedings of the Child Conference for Research and Welfare. Conferences held at Clark University in the summers of 1909 and 1910. Vol. 1, 1909, 257 p., contains 48 papers on problems relating to child welfare. Vol. 2, 1910, 287 p., contains 34 papers, on similar subjects. The

papers in Vol. 1 were reprinted from the Pedagogical Seminary for September and December 1909, but those in Vol. 2, with one exception, have not been printed elsewhere. Price $2.00 per volume in paper, $2.50 in cloth. Louis N. Wilson, Publisher, Worcester, Mass.

In connection with the celebration of the 20th anniversary of Clark University in September, 1909, conferences and lectures were held in the departments of Psychology and Education to which distinguished scientists and educators in this and other countries contributed. Lectures were given in Pedagogy and Psychiatry by Prof. Sigmund Freud of the University of Vienna and Dr. Carl C. Jung of the University of Zürich; in Psychology by Prof. William Stern of the University of Breslau, by Prof. E. B. Titchener of Cornell University, Prof. Franz Boas of Columbia University, Prof. H. S. Jennings of Johns Hopkins University, and Dr. Adolf Meyer of the Johns Hopkins Medical School; and in School Hygiene by Prof. Leo Burgerstein of the University of Vienna. The conferences in Psychology were presided over by Prof. Guy Montrose Whipple of Cornell University and Prof. Carl E. Seashore of the University of Iowa; and those in Education by Dr. Elmer Ellsworth Brown, U. S. Commissioner of Education, Prof. F. B. Dresslar of the University of Alabama, and Dr. Thomas A. Storey of the College of the City of New York. The lectures in Psychology, Education and School Hygiene and the papers presented at the Educational Conferences have been published in a volume entitled *Lectures and Addresses Delivered Before the Departments of Psychology and Pedagogy in Celebration of the 20th Anniversary of the Opening of Clark University.* Worcester, 1910.

Chemical Addresses: A collection of papers presented at the chemical conferences of the Second Decennial Celebration of Clark University. The collection has been published

jointly by Clark University and the American Chemical Society. In organizing the conferences an effort was made to have all the more important branches of chemical research represented by competent lecturers. The collection includes:

1. Professor Marston Taylor Bogert, of Columbia University: *A Review of Some Recent Investigations in the Quinazoline Group.*

2. Professor John E. Bucher, of Brown University: *The Acids of the Phenyl-Propiolic Series and Their Condensation to Naphthalene Derivatives.*

3. Dr. André Debierne, of the University of Paris, France: *Review of Recent Progress in Radioactive Chemistry.*

4. Dr. C. S. Hudson, of the United States Department of Agriculture: *A Review of Discoveries on the Mutarotation of the Sugars.*

5. Dr. P. A. Levene, of the Rockefeller Institute of Medical Research: *Review of Recent Progress in Bio-Chemistry.*

6. Professor Arthur Michael, sometime Director of the Department of Chemistry in Clark University: *A Theory of Organic Chemistry Founded on the Law of Entropy.*

7. Professor S. P. Mulliken, of the Massachusetts Institute of Technology (formerly of Clark University): *Progress in Systematic Qualitative Organic Analysis.*

8. Professor William A. Noyes, of the University of Illinois: *Molecular Rearrangements of Carbon Compounds.*

9. Professor Theodore William Richards, of Harvard University: *Review of Recent Advances in Thermochemistry.*

10. Mr. Michael D. Sohon, of the Morris High School, New York: *Secondary School Chemistry: Method of Teaching It and Content of the Course.*

11. Professor Julius Stieglitz, of the University of Chicago (formerly of Clark University): *Catalysis, on the Basis of Work with Amido-Esters.*

12. Professor H. P. Talbot, of the Massachusetts Institute of Technology: *Correlation of the Chemical Courses in Secondary Schools and Colleges.*

13. Professor Edward W. Washburn, of the University of Illinois: *The Fundamental Law for a General Theory of Solutions.*

14. Dr. Willis R. Whitney, President of the American Chemical Society, Director of the Research Laboratories of the General Electric Company: *Organization of Industrial Research.*

15. Mr. Jesse E. Whitsit, of the De Witt Clinton High School, New York: *Secondary School Chemistry: Content of the Course.*

The above papers have already been gradually published, partly in *Science*, but mostly in the *Journal of the American Chemical Society.* Further papers, presented at the Clark Celebration by Professor Wilder D. Bancroft, of Cornell University, Professor Gilbert Newton Lewis, of the Massachusetts Institute of Technology, and Professor James F. Norris, of Simmons College, could not be prepared for publication.

China and The Far East, pp. xxii, 455, New York: T. Y. Crowell and Company, 1910, $2.00 net. This volume, edited by George H. Blakeslee, contains, in addition to the historical introduction by the editor, twenty-two of the addresses delivered during the Conference upon China and the Far East, which was held at Clark University, October, 1909, as one part of the Twentieth Anniversary Celebration of that year.

Lectures delivered at the celebration of the Twentieth Anniversary of the foundation of Clark University under the auspices of the Department of Physics.

Vito Volterra, University of Rome: *Sur quelques progrès récents de la physique mathématique.* Three lectures.

Ernest Rutherford, University of Manchester, Nobel laureate: *The History of the Alpha Rays from Radioactive Substances.*

Robert Williams Wood, Johns Hopkins University, Rumford medallist, American Academy of Arts and Sciences: *The Optical Properties of Metallic Vapors.*

Carl Barus, Brown University, Rumford medallist, American Academy of Arts and Sciences: *Certain Physical Properties of the Iron Carbides, together with Inferences Deducible Therefrom.*

Published by Clark University, pp. 161, $2.00.

THE AMERICAN JOURNAL OF PSYCHOLOGY. This journal was commenced in November, 1887, and is now edited by G. Stanley Hall, E. C. Sanford, E. B. Titchener (Cornell University), and J. W. Baird, with the assistance of an international board of co-operators. Each volume contains four numbers—issued in January, April, July and October. Besides original articles, a considerable portion of its space is devoted to careful digests of the important literature in its field. Price $5 per volume; single numbers, $1.50. Florence Chandler, Publisher, Worcester, Mass.

THE PEDAGOGICAL SEMINARY. This journal was begun in January, 1891, and is edited by the President of the University with the assistance of William H. Burnham, Professor of Pedagogy. It is an international record of educational literature, institutions and progress, and is devoted solely to the highest interest of education in all grades, with digests of important literature of all countries. It is the organ of the Educational Department of the University. Each volume contains four numbers—issued in March, June, September and December. Price $5 per volume; single numbers, $1.50. Florence Chandler, Publisher, Worcester, Mass.

JOURNAL OF RELIGIOUS PSYCHOLOGY (including its authropological and sociological aspects). This journal was begun in May, 1904, and is now in its fifth volume. It is edited by President G. Stanley Hall and Professor

Alexander F. Chamberlain. The aim of this journal is to publish original material from all parts of the field of religious psychology. Special attention is devoted to the literature of the subject, both books, monographs and articles in current periodicals. It is published quarterly, each volume (containing about 500 pages) beginning with the January issue. Price $3.00 per volume; single copies $1.00. Louis N. Wilson, Publisher, Worcester, Mass.

The Journal of Race Development. This journal was begun in July, 1910 and is edited by Dr. Blakeslee and President Hall with the coöperation of a board of sixteen contributing editors. It offers itself as a forum for the discussion of the problems which relate to the progress of races and states generally considered backward in their standard of civilization. Issued quarterly, each number containing about 125 pages. Price $2.00 per volume; 50 cts. per number. Louis N. Wilson, Publisher, Worcester, Mass.

The Waverly Press
WILLIAMS & WILKINS COMPANY
BALTIMORE, U. S. A.

UNIVERSITY OF ILLINOIS-URBANA
3 0112 111481864